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GENERAL NEWS SECTION

MANY railway officers have been under the impression that the adoption of powerful Mallet locomotives would cause considerable trouble by break-in-tuos and the resulting damage to the freight cars in starting long trains. Inquiry as to this has been made of a number of roads which have had more or less experience with the large locomotives, and if there is any trouble of this sort it does not appear to be at all serious. Everything depends on the proper handling of the locomotives. An officer of one road, whose engineers are men of limited experience, very few of them having run an engine more than four years, says that it is surprising to find how quickly the engineers will learn to handle trains of from 5,000 to 6,000 tons without breaking them in two, if the cars are what they ought to be.

Some trouble was experienced with 40-ton steel underframe cars from a neighboring road, which were equipped with weak draft gear and poor couplers, but this was materially reduced by getting the owners of the cars to pay more attention to the condition of these parts. Another road reports that the Mallet locomotives lose less time in starting and handling trains than the simple locomotives, because the two units of the type of Mallet which it is using do not slip simultaneously, and this is true whether the engine is working compound or simple. If one unit does slip the other is not affected, and the strain on the train is continuous. The usual practice on this same road is to double head with two 4-8-0 locomotives, the combined weight of which is from 10 to 15 per cent. heavier than a single Mallet; they haul more tonnage than the Mallet, but the records show that this is accomplished without any more damage to the cars than when a single engine is used. A western road, which also uses Mallets in road service, reports that when these locomotives are loaded to their capacity they will start the trains easier than is possible with consolidation locomotives. This, because of the fact that the Mallet can be operated simple when starting the train, thus greatly increasing the tractive effort and allowing the locomotive to move off easily.

WE publish on another page two letters, one entitled "The Operation of a Division" and the other "Clogging the Wheels with Explanations and Reports," which deal with practically the same subject in much the same way, although they come from railway men in two quite widely separated sections of the country. Both voice the complaint that under modern conditions and methods of railway operation the superintendent of a division often has not the opportunity to superintend it. He is kept busy today, they say, explaining the things that happened yesterday, and the consequence is the happening today of things which he will have to explain tomorrow. While his subordinates run the division the superintendent is elevated or depressed to the rank of the official explainer. Anyone who will inquire among the superintendents will be told that there is a good deal of truth in all this. Of course, no one questions that the higher operating officers should keep in close touch with the operation of each division and demand explanations of important events or conditions the reasons for which are not clear. But the more time, thought and energy the superintendent must give to explanation and justification the less he will be able to give to doing his proper work, that of operating his division, and, in consequence, the more things there will be for him to explain and justify. It is a defect of some men that after they have delegated certain duties to their subordinates they do not supervise and check them up enough to make sure that they are doing their work properly. It is an even worse defect, however, for a superior to supervise, criticise and demand explanations until he deprives his subordinates of opportunity and inclination freely to exercise initiative and enterprise. The job of a superintendent is to superintend. If he is not big enough for his job, the best thing to do is to get somebody who will be. If he is big enough for the job, he is big enough to be given a pretty free hand in determining both what he shall do and what he shall explain. If it is necessary to have an official explainer to satisfy the curiosity of superior officers and their chief clerks, might it not be a good plan to designate some particular assistant superintendent or other subordinate officer to spill the ink of explanation, and let the superintendent go out on the line, perform each day his proper function of superintending the operations of that day, and thereby reduce the necessity of explanation to a minimum?

THE Chicago freight handlers, who have been on strike since May 4, agreed on June 27 to an unconditional surrender, by which the railways will take back into service, by July 31, 1,800 out of the 5,865 employees who left their work. The places of the others have been filled, and many of those who took part in the walkout have lost their pension

rights. That the strike of the shop employees of the Harri-man Lines, the Illinois Central and the Missouri, Kansas & Texas last fall has been a complete failure from the standpoint of the strikers is demonstrated by the efforts they are now making to secure a sympathetic walkout on the other western lines. Both the shop employees' and the freight handlers' strikes have caused inconvenience to the public and have cost the railways large amounts of money, but the results to the roads of their having the courage not to yield should be well worth the cost. The present, from the standpoint of employees, is a bad time to strike. In the case of the freight handlers' strike the settlement was effected by the intercession of the shippers, as represented by the Chicago Association of Commerce. When times were good and traffic heavy the railways were perhaps too prone to submit to the demands of the walking delegates and grant high wages to avoid the reductions of earnings that strikes would cause. When traffic and earnings fell off, the high wages remained and operating expenses could not be reduced in proportion to the decline in earnings. Apparently some of the labor leaders had become so flushed with their successes in obtaining wage advances in good times, on the simple argument of the increased cost of living to the employees, and regardless of the effect of the same cause on the railways, that they thought they could continue to get higher wages and more favorable conditions of work in bad times. But they now find the railways more disposed to fight and public sentiment less inclined to support every demand of labor. The settlement of the freight handlers' strike will enable the railways to establish at Chicago a plan of compensation based on the tonnage of freight handled instead of on hours worked. The result doubtless will be that the employees will receive higher average wages, while the railways will get a given amount of freight handled at a reduced cost instead of at an increased cost, which would have been the result if the strike had been successful.

GOVERNOR STUBBS, of Kansas, who formerly made a lot of money as a railway contractor and is now a progressive statesman, devoting a good deal of his time to calling the railways and other corporations names, testified in a famous rate case that he could reproduce the railways of Kansas for \$25,000 a mile—we believe that was the figure. O. C. Barber, chairman of the Diamond Match Company, who got rich from the profits of a concern that used to get its share of railway rebates, and who now spends his leisure in writing magazine articles and making speeches attacking the railways for having once given rebates, recently declared that the "upset cost" of railway construction under modern conditions is \$50,000 a mile; argued that the railways of the United States, whose outstanding securities amount to less than \$63,000 a mile, are over-capitalized; and made an argument for government ownership. In view of such utterances as these the figures given in an article on another page regarding the cost of reconstruction of the Panama Railroad are instructive. This road is owned by the government of the United States, and the reconstruction is in charge of United States army engineers. The cost of labor and materials has been high, the work very heavy, and the standards of reconstruction high. On the other hand, it has not been necessary to buy right of way, which, of course, the government already owned. Up to the time that the hearing before the house committee on interstate and foreign commerce was held, at which the facts that we give elsewhere were presented by officials of the line, the expenditures on reconstruction had been \$167,000 per mile, and it was estimated by the witnesses that when the work was finished the cost would be \$226,190 a mile. The *Railway Age Gazette* has not the slightest intention to imply that there has been any dishonesty or waste. On the contrary, doubtless the work has been done honestly, economically and skillfully. In any event, however, men like Mr. Stubbs and Mr.

Barber will hardly give these figures to show how cheaply railways can be built, how much those of the United States are over-capitalized, and how much more economical construction and operation would be under government ownership. They are just as unlikely to cite them in their arguments as they are to cite the fact that the average rate per ton per mile charged commercial freight on the Panama Railroad under government ownership is 4.14 cents, as compared with 7.53 mills on the railways of the United States. If the reconstruction of the Panama Railroad is being economically done, the figures show how much railway construction and reconstruction cost under difficult conditions such as often have been encountered in the United States as well as in Panama; and if the work is not being economically done, it is an argument against government ownership, for with army engineers in charge and the location of the line far from the political influences of Washington, the conditions were as favorable for economy as they ever could be under government ownership.

NEW ACCOUNTING RULES PRESCRIBED BY THE COMMISSION.

THE Interstate Commerce Commission has issued its form for income account and profit and loss statements, for railways, and its classification of revenues and expenses of sleeping car operations, of auxiliary operations and of other properties, for sleeping car companies. Both orders become effective July 1. Both orders carry out in general the theories of accounting which the commission has already committed itself to in its other orders in regard to railway accounting.

The income account form and the profit and loss form are the two connecting links between the classification of revenues and expenses, the rules for which the commission has already had in effect since 1907, and the general balance sheet statement, rules for which the commission has had in effect since 1910. Since the commission has already prescribed forms for revenues, operating expenses, additions and betterments, etc., the income account and the profit and loss account, as now prescribed, contain no surprises.

The commission defines the income account as the account which brings together those accounts that show the total amount of money that a company received, or has become entitled to receive, from its transportation and other operations during a given fiscal period; the return accrued during the period upon investments; the disbursements and obligations incurred that affect the amounts so received or accrued, and the disposition or allocation of the net income accrued. The net balance shown by the income account is carried to profit and loss. The income account prescribed by the commission is on the basis of accruals. Regardless of whether or not bills contracted in a given fiscal period are paid in that period or the money earned in that period is received, the income account for that period under the I. C. C. rules should show the transaction completely.

The income statement is divided into four primary accounts: railway operating income, other income, deductions from gross income, disposition of net income. These four accounts are divided into thirty-six other accounts.

The principal facts about the income account, that would not have been already suggested by the various accounting orders of the commission, are the segregation of appropriations of income to sinking and other reserve funds, and the treating of the receipts and disbursements for reserve funds and sinking funds entirely in this separate account. To illustrate, the dividends received on stocks of other companies, held in sinking or reserve funds, are not included in the account "dividend income," but are credited to "income from sinking and other reserve funds." Companies are allowed to use their own discretion as to whether to appropriate money for additions and betterments from income, or from profit and loss. The same is true as to dividends.

In a note defining "interest deduction for funded debt," the

commission says that when a funded debt is incurred for new lines or extensions the interest that accrues on the funded debt after the lines are open for operation should be included in this account and should *not* be charged to road and equipment account and interest and commissions, but to "interest deduction for funded debt." There was a chance here for the commission to have been much more definite than this. There still seems to be considerable confusion of ideas as to when a road is in operation. Trains were being run, for instance, over the Western Pacific for more than a year before the company began making monthly reports to the Interstate Commerce Commission, and presumably the W. P. did not consider itself a road in operation. It would seem a good opportunity for the commission to clear up an important point that is still left in a vague state by defining in its new accounting orders what is meant by roads being in operation.

The profit and loss statement is divided into fifteen accounts, four of which are credits and the remainder debits. The form of this statement differs little from that now used by roads which have accepted the principle of the formation of the general balance sheet, as prescribed by the Interstate Commerce Commission. The form prescribed provides for appropriations for dividends, for additions and betterments, for new lines through surplus and for loss on abandoned road and equipment. This apparently indicates that the commission has not changed its views on the way of charging abandoned property which is replaced. It will be recalled that the commission's rule is to charge the cost of such property which is replaced to operating expenses, and there is at present in the courts a case brought by the Kansas City Southern to have this rule of the commission declared confiscatory.

The classification of revenues and expenses for sleeping car companies is logical, and some such classification is absolutely necessary if the commission is to intelligently and adequately regulate the operation of sleeping cars and parlor cars. By sleeping car companies, apparently the commission means companies which operate sleeping cars, private passenger cars, parlor cars, etc. These companies are required to separate their revenues and expenses from operation from their revenues from auxiliary operations, which means such operations as dining cars, buffet cars, selling cigars and liquors on sleeping cars, etc., and their revenue and expenses from other properties, which means manufacturing plants.

Revenues of sleeping car operations are divided into 21 kinds. The division has been made apparently with the primary object of getting accounts which will show quite definitely the sources of revenue and expenses so as to give the commission a basis on which to issue orders reducing or sustaining particular rates. The revenue from standard sleeping cars, for instance, is divided as between berth revenue and seat revenue, and as between charter—per diem rates—charter berth rates and car mileage revenue. Tourist sleepers are separated from standard sleepers and chair cars.

Expenses of sleeping car operations are divided as between maintenance, conducting car operations and general expenses. Maintenance is divided into 26 accounts; conducting car operations into 14, and general expenses into 9. Under maintenance the same policy of charging for depreciation is adhered to as in the case of maintenance of railway passenger and freight equipment.

It is unnecessary to comment at any length on the form of the accounts which the commission has just issued, since most of the comments that have been made heretofore in these columns on the general system of accounts prescribed by the commission apply equally to those orders just made. There should be a full system of accounts for sleeping car companies. It has been pointed out before in these columns that the relations of railways with private car companies are a possible source of evil, and anything that will tend to give publicity to these relations and put them beyond suspicion of graft in any way is to be welcomed.

LEGISLATION REGARDING RESTRAINT OF COMPETITION.

THERE has been a marked change in the attitude of business men, economists and statesmen toward industrial and railway competition within recent years. Formerly competition was regarded as the specific for all transportation, industrial and commercial ills. It was considered the sovereign stimulator of industrial efficiency and the only effectual preventive of excessive rates and prices. This theory found expression in the enactment of the Sherman law. Under the common law only unreasonable agreements in restraint of trade—in other words, unreasonable agreements to limit competition—were unlawful; and the framers of the Sherman law meant only to enact into a federal law what had been understood to be the common law. In its earlier decisions, however, the Supreme Court held that the law prohibited agreements in restraint of competition, whether reasonable or unreasonable, and it applied this interpretation especially in railway cases. The legal opinion of the country revolted against this interpretation, and the economic and business opinion of the country revolted against the law as interpreted. The legal revolt finally triumphed in the decisions in the Standard Oil and American Tobacco Company cases, in which the Supreme Court reversed its earlier decisions, and held that the law prohibited only unreasonable restraint of trade. The revolt of business men and economists against it has been manifested by repeated attempts to secure legislation which would more clearly define unreasonable combinations, would specifically authorize reasonable combinations and would provide governmental machinery for separating the sheep from the goats.

S. P. Bush, president of the Buckeye Steel Castings Company, and Allen Ripley Foote, chairman of the executive committee of the Ohio State Board of Commerce, recently have advocated in testimony before committees of Congress, and also in pamphlets, legislation which would permit persons and corporations engaged in similar lines of business to enter publicly into reasonable agreements to prevent destructive competition. Mr. Bush, in his pamphlet entitled, "The Sherman Act and Trade Agreements," has indicated his views in the following language:

"If the law would permit those in any industry to agree not to sell below average cost, including 6 per cent. on the capital actually engaged, and preferably a small profit, say, 6 per cent., would it not be ethically and economically sound and wise? Is it economically sound to sell at or below cost, or without a small profit? Would anyone be injured? Would it not be an advantage to labor, to capital and to the people at large to stop selling at or below cost? . . .

"If a scientific basis, or set of rules, approved by the government, for determining cost could be generally used, would it not be a vast economic advantage? Such a cost determination could be a requisite for such a trade agreement. It would necessarily have to cover a sufficient period of time to furnish a fair average, for it should include the cost during lean times as well as good. The agreement would be based on the average of all those who would be parties thereto, so that those who by efficiency could produce below the average would obtain their just reward and those who were inefficient would in time drop out or become efficient, a natural and fair result."

Mr. Foote has drafted for the consideration of Congress a bill to permit reasonable agreements between competitors to maintain prices under the provisions of which the question of whether an agreement was reasonable would be submitted to the determination of a commission of business men, especially organized to pass on the particular agreement. He believes that business men could determine better than any other class what is fair and beneficial, and what otherwise, in business methods.

Every intelligent and fair-minded man concedes that it is not every agreement in restraint of competition that is unreasonable and injurious. Agreements to maintain exorbitant prices are wrong and harmful to the public, but, on the other hand, competition carried to such an extreme that it prevents all of the competitors, or even most of them, from earning a reasonable profit, is destructive to industry, and, by tending to eliminate

all the competitors but the strongest, paves the way for monopoly. Obviously, legislation should no more interfere with combinations that are salutary than it should permit those that are injurious.

Over 20 years' experience with the Sherman law shows that sweeping, indiscriminating prohibitions of combinations, whether industrial or railway, are not only ineffectual, but defeat their own purpose. The Sherman law, preventing reasonable trust agreements from being publicly made, has caused such agreements to be made secretly, and secret agreements are much more likely, as experience has shown, to be unreasonable than are public agreements. Prohibiting reasonable agreements to prevent destructive competition, the law has impelled the competitors in many cases, in both the industrial and railway fields, to consolidate, thereby eliminating competition altogether. It would not be shooting very wide of the mark to say that the Sherman law, whose purpose has been to maintain competition, has been, because of the sweeping nature of its provisions, the main agency for fostering unreasonable combinations and monopolistic consolidations.

In view of these facts and of the conditions with which business interests of all kinds are confronted, proposals such as those of Mr. Bush and Mr. Foote should be given very serious consideration. In the past the shipping interests of the country repeatedly have invoked the Sherman law against the railways, because they believed that unrestrained railway competition was necessary to keep rates down to a reasonable basis. The attitude of the industrial interests seems to be undergoing a change. The Interstate Commerce Commission having been given ample powers to control railway rate-making, shippers no longer have any ground for fearing agreements between competing railways regarding rates; and as a result of the enforcement of the Sherman act against industrial combinations, many business men have been awakened to the defects of that law. It would seem, therefore, that the time ought soon to come, if it is not already here, when all the classes of business interests injuriously affected by the anti-trust law could be united in a movement for its amendment. The Sherman law having been tried for almost a quarter of a century, and there being almost universal concurrence in the opinion, regardless of varying points of view, that it has been a complete failure, it is hard to see how there can be any dissent from the proposition that there ought to be adopted some method for dealing with railway and trade agreements differing very materially from that provided for in this statute.

NEW BOOKS.

Waterways Versus Railways. By Harold G. Moulton, instructor in political economy in the University of Chicago. 468 pages, 5½ in. x 8¼ in. Bound in cloth. Houghton Mifflin Company, Boston. \$2 net.

Professor Moulton has presented in this volume the most interesting, thorough and conclusive discussion of the question of the desirability of extensive development of inland waterways in the United States that has ever appeared in print. The title of the book is a little misleading. It does not deal with waterways in general, but with inland waterways in particular. It is devoted largely to a comparison of the actual present relative costs of transportation on inland waterways and railways in Europe and the United States, and of what the probable costs of transportation by the two agencies would be if the government of the United States should carry out the plans advanced by the advocates of extensive building of canals and canalizing of rivers in this country.

Mr. Moulton gives a list of waterway development projects that are being advocated, and their total estimated cost foots up over a billion dollars. This includes an estimate of \$159,000,000 for a 14-ft. lakes-to-the-gulf deep waterway, and, as is well known, the ultimate goal of the advocates of this project is a 24-ft. channel. In view of what ship canals and the harbor facilities necessary to make them useful have cost in other parts

of the world, Mr. Moulton concludes that "it is reasonable to believe that a ship canal 24 ft. deep between Chicago and the Gulf of Mexico could not be constructed and placed in harmonious relationship with the railways for less than \$1,000,000,000. It should be added that if the plan of building first a 14-ft. waterway to be enlarged later to 24 ft. were to be followed the total cost would in all probability prove greatly in excess of this amount." Therefore, it is within the bounds of conservatism to say that the inland waterway projects now advocated would cost about \$2,000,000,000.

Mr. Moulton clearly recognizes and throughout insists upon the principle that from the standpoint of the public welfare the real question to be considered is not whether water transportation can be made cheaper than rail transportation for the shipper, but whether the total cost of water transportation, including the interest on the amount expended in developing the waterways, the cost of maintaining them, plus the cost of maintaining and operating the boat lines and a reasonable return on the investment in them, can be made cheaper than the total cost of railway transportation; for, as he very lucidly shows, and as has been pointed out repeatedly in the columns of the *Railway Age Gazette*, if the total cost of railway transportation can be demonstrated to be less than the total cost of inland water transportation, then the government could secure cheap transportation for the shipper at less cost to the taxpayer by subsidizing transportation by rail rather than by subsidizing transportation by water. As Mr. Moulton says, if additional facilities of transportation can be provided more cheaply by building railways than by building waterways, and it is felt that additional facilities should be provided by the government, then the best thing for the government to do would be to expend such money as it has to lay out on internal improvements in building railways rather than in building waterways.

The most interesting of the chapters in which Mr. Moulton analyzes and compares the relative costs of railway and inland water transportation are those dealing with the situation in Germany. There, if anywhere, the evidence that transportation on canals and canalized rivers can be made cheaper than on railways would be found. Mr. Moulton finds that various commercial, geographic and administrative advantages have combined in an exceptional manner to further the transport of goods on the Rhine, and his conclusion is that transportation on it is cheaper than it is by rail. He seems to believe, however, that if the railways of Germany were allowed to more freely adjust their rates within the limits of the cost of rail transportation, in order to meet the competition of the Rhine, they would be able to take much of its business away from it. He concludes, giving very elaborate statistics to support his conclusion, that the total cost of transportation on the railways of Germany, although their rates are much higher than the rates of the railways of the United States, is less than the total cost of transportation on the canalized rivers of Germany, and much less than on the canals.

The greatest inland canal of Germany is the Dortmund-Ems. Mr. Moulton's analysis of the cost of transportation on it is interesting as illustrating his method and even more interesting for what it shows. We quote as follows from pages 215 to 219 of his book:

"The location could hardly be improved upon. From the very center of the mining territory the canal runs almost due north, a distance of 155 miles to the North Sea port of Emden. The country is almost perfectly level, and for 62 miles of the distance existing waterways were utilized, leaving only 93 miles to be entirely excavated. The capacity is sufficient for barges carrying 600 tons. . . .

"The following table shows the complete cost of the project, including the branch, Ems-Jade Canal, near Emden:

Canal proper to April 1, 1906.....	\$17,812,243
Dortmund Harbor	1,306,888
Emden Harbor	1,725,000
Later canal works	1,375,000
Ems-Jade Canal	2,273,942
Total	\$24,493,073

"This total cost of \$24,493,073 is equal to \$157,648 per mile for the

155 miles of the main canal; this is once and a half as much as the average capitalization of German railways, which are fully equipped for both freight and passenger service, and probably three times what it would have cost to build an all-freight railway. The above statistics, moreover, do not include the cost of boats, a very important item, as is apparent from the amount of the traffic.

"The statistics which will be found of greatest significance, however, are those which reveal the yearly cost of operation and maintenance. The state fixes the tolls that are charged for the use of the waterway at a very low figure, varying from 7.5 to 14.5 cents a ton, according to the character of the freight; while the harbor dues are from .5 to 1.5 cents a ton. Although the harbor dues are sufficient to cover the mere operation outlays, those on the canal are not adequate to cover even running expenses. In both cases a large yearly interest has to be paid from general taxation sources. In the following table are gathered together statistics showing the yearly deficit. The only available statistics are those for the year 1905, as furnished by Mr. Peters:

Operation deficit on Dortmund-Ems Canal.....	\$174,432
Yearly interest and sinking fund, at 3.5 per cent..	623,428
Operation deficit on Ems-Jade Canal.....	16,471
Yearly interest and sinking fund, at 3.5 per cent..	79,588
Operation surplus on Dortmund Harbor.....	\$31,361
Yearly interest and sinking fund, at 3.5 per cent.	45,801
Net deficit	14,440
Total deficit*	\$908,359

*Emden harbor is not included, statistics not being available.

"The astonishing fact is here disclosed that, in order to encourage traffic on the prize canal of Germany, the government and interested cities were obliged to donate to the waterway more than \$900,000 in the single year 1905. Let us see what this amounts to in the way of freight rates.

"In the year 1905 the tonnage carried was 1,518,000. The donation in that year, therefore, amounted to a fraction less than 60 cents a ton. It is regretted that financial statistics of a later date are not available; but it is practically certain that there can have been little improvement. While the traffic has increased, thereby perhaps appreciably reducing the cost of haulage for each unit of traffic, there have been increased capital outlays amounting to \$1,375,000, the interest on which is probably sufficient to counterbalance the saving from increased tonnage. The year 1905 may consequently be regarded as typical.

"This 60 cents a ton, however, by no means represents the total cost of transportation on the canal. It is merely a bonus given to attract the traffic away from the railways. The state's tolls, the harbor dues, and the freight charges of the boat companies are yet to be added. We have seen that the tolls, according to the class of freight, vary between 7.5 and 17.5 cents per ton. Since the larger portion of the tonnage is low-class freight, the average charge should perhaps be placed as low as 9 cents a ton. The harbor dues varied from .5 to 1.5 cents per ton; an even cent per ton will not be far from the average. These dues, then, amount to about 10 cents per ton. The freight rates on the canal are, for all classes of freight, 1.9 pfennigs per ton per kilometer (about 2.8 mills per ton per mile). At least three-fourths of this traffic travels practically the full length of the canal. In 1908, of the downstream traffic through the Meppen locks, 76.5 per cent. was coal, and of the upstream tonnage, 67 per cent. was iron ore. All of this, at least, traveled practically the entire length of the canal. Since the total length of the route is 250 kilometers, one may safely take 200 kilometers as the average haul. At 1.9 pfennigs per ton per kilometer, the freight cost proper is, then, approximately 95 cents a ton. Summarizing: \$.60 (deficit), + \$.09 (tolls), + \$.10 (harbor dues), + \$.95 (freight charge) = \$1.74, the cost per ton of carrying low-class freight an average distance of about 200 kilometers, or 123 miles.

"It should be noted here that since Prussian railways are conducted at a very good profit, this waterway rate is not computed on the same basis as are railway rates. Were the waterway to yield a large net revenue to the state, the rates would obviously have to be much more than \$1.74 a ton. It should be stated that the boat companies attempt to make a profit on the carrying business, but since the capital invested in barges is very small in comparison with that invested in the waterway itself, it cannot be said that this fact materially affects the situation. To earn a net profit of 2.5 per cent. on the total capital invested in the waterways, as in the case of railways, would necessitate raising the water rate to more than \$2 a ton. These figures, it will be seen, are only roughly approximate, for by the nature of the case it is impossible to make a mathematically exact computation. Accepting the above figure, then, as only approximately accurate, let us compare it with the German railway rates.

"The rates on the German railways are 2.49 pfennigs per ton per kilometer for coal, and 3.55 pfennigs per ton per kilometer for the average on all classes of goods. If all of this 1,518,000 tons of canal traffic, therefore, were carried at the coal rate, the cost per ton, using the same distances as above, would be \$1.25. If it were carried at the average rate of all commodities on the railways of the country, the cost would be \$1.78 per ton. Since 76.5 per cent. of the downstream traffic is coal, 67 per cent. of that upstream is iron ore, and nearly the whole is low-class freight, the average freight rate would doubtless be under \$1.40 a ton. This is as against more than \$2 by water. And even yet, it should be observed, the cost of transshipment from rail to water, and *vice versa*, is not included in the water computation. All in all, therefore, water

transportation is here seen to be much more costly than that by rail. No better illustration could be desired than the Dortmund-Ems Canal, to show the fallacy of the almost universal contention that canal transportation is essentially cheaper than that by rail."

The evidence given by Mr. Moulton that the expenditures of the German government on the building of canals and canalizing of rivers has involved and is still involving enormous economic waste is so overwhelmingly conclusive that one naturally is led to wonder upon what theory intelligent government officials can persist in the present policy. Their theory is very concisely stated in the following quotation which Mr. Moulton gives from an article by Dr. Sympher, head of the waterways division of the department of public works: "The cost of transportation on German waterways is considerably less than by rail. The freight charges between places that are situated directly on the waterways and are reached without the aid of railways are generally far less than the railway charges, and on long water stretches this is all the more perceptible, *as the state levied taxes cannot be considered.*" (The italics are ours.) Just why the state levied taxes cannot be considered, Dr. Sympher did not say, and Mr. Moulton could not find out. It is easy to prove any proposition if the proponent be permitted to ignore all the evidence against it, and to put in all the evidence for it.

Mr. Moulton's demonstration of the relatively greater total cost of water than of rail transportation in other European countries is more conclusive, if possible, than the evidence introduced by him in reference to the situation in Germany. He accepts the view of M. Colson, the eminent French authority on transportation, that the real power which is behind the movement for waterway development in Germany is the Emperor, who "is suffering from a delusion" that the development of inland navigation is absolutely indispensable to the development of ocean commerce.

After having presented the case of waterways versus railways in European countries, Mr. Moulton turns to a discussion of "The Lakes-to-Gulf Ship Canal" (chapter 15), "Fourteen Feet through the Valley" (chapter 16), "A Depth of Eight Feet from Lakes to Gulf" (chapter 17), "Improvement of the Ohio River" (chapter 18) and "The Enlargement of the Erie Canal" (chapter 19). He concludes that if a lakes-to-gulf ship canal 24 ft. deep were dug, it would cost at least a billion dollars; that the total cost of transportation on it would exceed the total cost of transportation by rail, even if it were used by 10,000-ton vessels; that it is wholly improbable that ocean vessels would use it, because the draft of large freighters is now around 28 ft. and in another 20 years—in other words, by the time the canal was finished—a depth of more than 24 ft. would become the rule. His conclusions are almost equally adverse to the 14 ft. and 8 ft. projects, to the improvements of the Ohio river and to the enlargement of the Erie canal, but space will not permit a summary of the evidence and arguments that he advances in reference to them. However, we cannot refrain from quoting the three concluding paragraphs of the book, which concisely sum up Mr. Moulton's deductions and the reasons for them:

"We have found from our study that everywhere, in Europe no less than in the United States, there has occurred *pari passu* with the development of railways in the third quarter of the nineteenth century a rapid decline in the amount of traffic carried on inland water routes. This decline has continued to the present day in England and the United States, and it has been checked in the countries of continental Europe only by the extending of government subsidies to the waterways. In order to prevent the almost complete diversion of traffic from the waterways it has been necessary for government to assume all, or nearly all, the fixed charges connected with water transportation, to pay for building, equipping and maintaining the water routes, and to furnish them free of charge to the water carriers. When thus relieved of all save the mere direct cost of operating the boats, it is usually, though not always, possible for the water carriers to offer rates which enable them to compete with railways, which are entirely self-supporting. Even then, it is not infrequently necessary to protect the waterways still further from railway competition by arbitrarily compelling the railways to quote rates from 20 to 50 per cent. higher than those by water, as is the case in France and Belgium; and although the cost of transportation by water, when to the rate charged by the water carriers are added the taxes levied by the state in support of the waterways themselves, is usually much greater than that by rail, many

people have still clung, strange as it may seem, to the belief that canal transportation is much cheaper than that by rail.

"There can no longer be any question, however, that so far at least as canals are concerned, the cost of transportation, all factors included, is almost universally much greater by water than by rail. It is only in the case of very short canals which connect long stretches of naturally navigable waters that they can have any economic justification at the present time. While canals satisfactorily served the needs of an earlier period, their day, like that of the sickle, the hand-loom and the spinning-jenny, is now forever past. Precisely as the canal supplanted the horse in the carriage of through freight, so in turn has the railway, in the course of industrial progress, come to take the place of the canal in the field of transportation. To attempt now to return to the antiquated system of transportation of a half-century ago, or to make canals an integral part of a national transportation system, whether for the carriage of high-class or low-grade freight, it matters not, is to attempt to turn backward the clock of time.

"In the case of rivers, however, the situation may at times be somewhat different. But, after all, river transportation is usually analogous to that by canal, for comparatively few of our streams are really *natural* highways of commerce. As a rule they are navigable for the purposes of modern transportation, in name only, rather than in fact. So long as the cost of canalization of a river amounts to forty, sixty, or a hundred thousand dollars a mile, it belongs in the same category as a canal. A river like the Rhine, whose banks are firm, whose gradient is gentle, whose water supply is constant, and the cost of regulation of which is almost negligible, may, indeed, be regarded as a *natural* avenue of commerce; but a river such as the Mississippi, with ever-caving sides and shifting bottoms, with periods of alternating floods and droughts, and the control of which is, in the opinion of engineers, a greater task than the building of the Panama canal, is no more to be regarded as a *natural* highway of commerce than any artificial channel whatsoever. The test of the commercial success of such a river must lie in the cost of rendering it navigable for the purposes of modern transportation. Our investigations have indicated that it is only in rare instances that river transportation can be made as economical as transportation by rail."

In getting materials for the work the author consulted innumerable official publications and books and magazine articles on transportation, and also went abroad and secured a great deal of information at first hand both by observation and by conference with those who were best situated to furnish him authoritative materials. The book is very lucidly and interestingly written, and for the public welfare it is to be hoped that it will gain a very wide circulation.

Railroad Statistics. Price, Waterhouse & Co., 54 William street, New York. 9 in x 12 in.

This is a series of charts, bound conveniently, showing certain comparative operating statistics of 53 of the principal railways in the United States for the four years ended June 30, 1911. The roads are divided into eight groups, each group being shown on a single chart, and there is a ninth chart showing the aggregate and average figures for groups. The figures are taken from the annual reports to stockholders made by the companies, and additional figures are supplied when necessary from the reports made to the Interstate Commerce Commission. The figures that are shown are well selected to give an idea of traffic and operating conditions, and a fairly good idea of maintenance. The fact that four years' figures are shown for each road is a great help in studying the trend of conditions and makes this set of charts unique, we believe. Beside the total traffic statistics, there are figures showing the per cent. of total operating revenue consumed by each of the five classes of expenses recognized by the Interstate Commerce Commission. Revenue is shown per mile of road operated; maintenance of way is shown per mile of single track and per revenue train mile; and repairs of equipment is shown per locomotive, per pound tractive power, per passenger car mile, etc.

A set of charts like this, prepared under the direction of accountants with the reputation of Price, Waterhouse & Company, is to be welcomed. Like all other analyses of operating costs of railways, the figures must be carefully studied and can only be used to make comparisons as between different roads by those who have a considerable knowledge of railway operation and the factors which enter into unit costs on different roads. Many of the figures are those frequently referred to in any study of a railway's operation, and the book will form a valuable addition to any statistical library.

Letters to the Editor.

CLOGGING THE WHEELS WITH EXPLANATIONS AND REPORTS.

OMAHA, Neb., June 20, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the old days a division superintendent had time to know his subordinates personally; to study their characteristics and handle each man accordingly. Along the line, he knew the big shippers and most of the business men by their first names. He knew the speed and tractive power of his locomotives, and, what is more important, what each engineer could get out of them; the conductor's ability to get over the road, and the station agents' troubles. Things happened in those days, proportionately, about the same as today, but he handled them, and at times when it was of enough importance, made a report and an explanation to his superior officer. In order to be fully conversant with the facts it was sometimes necessary to hold an investigation. They look innocent enough, those two words—investigation and explanation—but there is not now an operating official in the world, who speaks English, but knows their meaning and knows it well—better than Webster. If there was a secret society of operating officials the pass word would be, "investigation," and the answer to the distress sign, "explanation."

Back in the 80's the trouble started. The general superintendent had so much business he could not see all of the explanations sent him by his division superintendents, so they were turned over to the clerks to handle. They had plenty of time and the authority to sign the "old man's" name; they asked questions; became hungry for explanations; and it was gratifying to their personal vanity to require a superintendent, who drew three times as much salary as they, to go into the minutest details of explanation and answer questions that only a person whose sole occupation is letter writing can ask. The growth of this evil has kept pace with the growth of railways. A division superintendent today is anywhere from one day to a week behind with his explanations, and has absolutely no hope of catching up. He comes to his office early in the morning and looks over the business handled last night and yesterday. The "Morning Report" is a birdseye view of his division, giving the train movements and yard conditions. A derailment here—a limited train delayed there—an engine gone wrong and delayed an important train—many things indicate his business is not moving freely. He commences to dictate letters and telegrams to his line officers, criticising and requiring explanations, fortifying himself with information to enable him to explain to his superiors (or to be exact, their clerks), and the day is gone with nothing to speak of done in the present—all of it spent in handling things that are past and gone. Even his visitors, who are not railway employees, call to register a complaint about some past neglect, and are promised an investigation and an explanation.

The call boy is doing today's business today and doing it by the clock. Each outbound train depends on him to furnish a crew.

The yardmaster is handling this minute's business. The kaleidoscopic problems of terminal work give no time for explanation. The past buries its dead without any post mortems, or coroner's inquests, so far as he is concerned.

The trick despatcher is in the same class. His finger is on the pulse of transportation, and he is working in the present tense with a short look into the future, planning his moves like a chess player.

The chief despatcher is the storm center—the dividing line between past mishaps and present happenings. No person should say or do anything that would add one atom to his duties. He is the busiest of the busy, and there is no one who

has to think as many times to the square inch, make as many important decisions to the minute, or change his plans as many times in a day as he. He always has the information you want on his tongue's end, and with the same breath tells some brakeman's wife on the 'phone when her husband's train will be in.

When we close the door to the despatcher's office we shut out the sound of the telegraph instruments, throbbing with the details of today's business, and as we pass the doors of the various offices down the hall the steady rattle of typewriters indicates that events from twenty-four hours to a month or more old are being investigated and explained. They cannot possibly catch up with the present. How would an official feel to step to his job some morning and find that he was free to supervise what was going on on his division that day; that there was no need to explain increases in operating expenses, decreases in net tons, engine failures, car shortages, delays, accidents, washouts, fires, labor troubles, or why Passenger Brakeman Jones allowed some prominent politician to get off at the wrong station and thereby miss a scheduled speech. The sensation would, indeed, be novel, and it would take time for him to become accustomed to such a change in conditions.

This is not to be construed to mean no questions, or nothing investigated; but really no business can be handled properly where yesterday's transactions take up all of the officers' time today. Even a fruit stand would prove unprofitable with that class of management.

Railway officers and their clerks reflect the individual characteristics of their superiors in the tone of their correspondence, and it is magnified on the way down the line. The files of some railways read like intended insults, and a man must be thick-skinned, indeed, who will not carry some rankling dissatisfaction and hatred in his heart all the time with each mail bringing a nagging, sneering insinuation that he ought to be a shepherd instead of a railway official, while other lines show a polite regard for the brains and experience that have advanced him to a responsible position and his feeling as well. And the latter brand obviously gets the best results. A man that must be ridiculed or scolded into the performance of his duty should be eliminated. There is something about the milling he gets on his way to promotion that is a sure cure for the swellhead, so that few officers are afflicted with it, nor would they get very far up the ladder if they were.

This explanation matter is not overdrawn. There is not a division official but will admit it is true to a considerable extent on his territory. The general officers, personally, widen out with their promotions and forget or do not realize that the practice still continues on the division they came from as well as on the new ones that come under their jurisdiction.

Some railways have line and staff officers, an organization patterned after the army. All of the roads are ready and anxious to take up new ideas and spend money for improved methods of operation, but none of them seem to have taken any steps to cut out of their correspondence "investigate and advise." Whether business is heavy or business is light makes no difference as to the number and volume of these "advise promptly" boys. Things that are overlooked in busy times are dug up during slack periods, and the little ones take up just as much time for explanations as the big ones. This is merely a poor business policy that started right, but has been allowed to go on unchecked until it has passed its stage of usefulness and become a fetter to the official in the proper discharge of his duties.

The question arises as to why this has not been stopped if it is as bad as this article would indicate. It will take a man high in authority to stop it—the general manager, at least; and there is enough of the military about a railway organization to prevent a subordinate official from even hinting that his superior's office force is taking up too much of his time requiring explanations.

The action that could be taken is similar to that taken by a certain western railway president, who thought there were too many reports being made, and to determine which ones were necessary, put out instructions that "effective at once, all reports will be discontinued"; and then said to the heads of the various departments, "Ask for the reports you find absolutely indispensable in the conducting of your business." Other roads have appointed committees to check up and eliminate superfluous reports, but with indifferent success, as the department heads can always find reasons why reports are indispensable, if asked about them. Some official finds an abnormal condition and applies a remedy, but in order to keep in touch with the situation until it clears up he asks for a report from a line officer on the job. The report once started continues, no one having the audacity to ask his superior to stop it. The abnormal condition has long since disappeared and others have sprung up with their quota of reports. This president was a wise one, who stopped them all.

It is possible and also probable that not a penny would be lost, not a wheel would stop, if some one with sufficient authority would say, "Effective at once, no explanations will be required of the operating department."

To be sure, to insure proper discipline, to correct violations of the rules, to place responsibility for occurrences of a disastrous nature, investigations and explanations are necessary; but the elimination of the objectionable features would give the division officer more time to get closer to his men, preserve discipline and detect violations of the rules before an accident occurs.

TRANSPORTATION.

THE OPERATION OF A DIVISION.

LITTLE ROCK, Ark., June 20, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The methods of operating a division today are as far from what they will be twenty or more years from now, as the present methods are from those of twenty or more years ago; and those of twenty or more years from now will be a great deal more on the order of those of twenty or more years ago.

The "old timer" who was given charge of a division, knew the business from the teachings of actual experience. It was small, business was not as heavy as now, and he knew each trainman, engineman, yard man and station agent personally. He knew each individual engine, its condition and capacity. By his practical knowledge of these things he distributed his brain power and his steam power to the best advantage. He was over his division each day, and knew what trains were run, what time they made, what they handled, and as far as the operation of his division was concerned, he was personally closer to it than two-thirds of our present-day superintendents. He was able to trim his sails as he went along, reducing or increasing force from day to day as was necessary.

The present methods on too many lines do not give the superintendent that close view of his situation and railways are paying a high toll to wait for the paper reports to see how they are doing. In the old days that I speak of the stockholders, directors and presidents were content with about one report a year. They were not well versed in the whys and wherefores of railway operation and were content with the knowledge that the business was a money-maker.

As the country developed, or I might say was developed by the railways, what we old-timers call "outsiders" bought the stocks and bonds. They got a voice in the handling of the properties, not only as directors, but finally as officers, and too many, with no practical knowledge, had ideas of their own as to what would be good policy, and to see that their policy was carried out hired men of their personal acquaintance. This, coupled with the fact that railways have grown faster than railway men of the experience of the old timer have been developed or come to

light, has brought our present method of operating a division to the half-theoretical and half-practical.

There are many superintendents who cannot tell anywhere near what the performance of their division was during the previous month, twenty days after its close. But when the operating sheet comes out, and is unfavorable, they can write up why. And so it goes from month to month. Today our superintendents are no nearer being real superintendents in the sense of having authority to actually superintend a division's operations than are the present methods like the old ways.

The new element, or the outsiders, watched first one avenue and then another, and gradually we have drifted to running the road to please these various hobbies. The operating sheet is about all that we need, and the ton-mile cost tells the story. The other volumes of doctored, obsolete and useless reports are of little, if any, value, and cause a great deal of expense. Even some of our own reports that show actual conditions do not do us enough good to pay the cost of stationery and clerical help to make them. Another thing to show that we are simply rail-roading along the line of least resistance is, that all you have to do is to make costs show a decrease. The difference in the relative costs of divisions is too wide in some places, but if both superintendents show a decrease, they are considered to have done equally well, when, as a matter of fact, the high man may be too high, and the low man too low for the best interests of the property.

In the matter of supplies we are still at a great disadvantage on most lines, even in the face of the good that was, theoretically, to come from the new supply department.

From observation on the operating side of the fence, I agree with D. A. D. in his letter, published in your issue of September 22, 1911. I have read the comments of the "Orphan" in your issue of November 10, 1911, i. e., that the superintendent, being responsible for the operating cost, should have what is necessary, and should have it quick when ordered, and unless something is ordered which is quite unusual, his approval should be all that is necessary. D. A. D. says, is it not more expensive to carry too small a working stock than one too large? The answer is, yes, and as the "Orphan" states, the supply department should be able to supply on demand material of every description requisite for the operation and maintenance of the property, unusual emergencies alone excepted. But does it do that? Not where D. A. D. or I have observed. We have yet to teach the supply department and a regiment of new born clerks in general offices that in over 75 per cent. of the cases the money they think they save by cutting off articles on the superintendent's requisitions is not saved, and in too many cases will not pay the interest on the expense incurred because the requisitions are not filled.

To save our part of the much-talked-of million a day, and to be in a position to pass muster with the efficiency boards, which are not many years off, we must get back to the old way of knowing our costs per day; in fact, must get closer to what is going on, and work to that end instead of figuring on how to explain away what really happened. There is no reason why this cannot be done. The train mile is the unit of operation. It is a question of tons per train mile, cost of overtime per train mile, pounds of coal per train mile, cost of station service, yard service, roundhouse service per the train mile. You can easily find the daily cost of all fixed charges, then a wire each morning telling the train miles, hours overtime, estimated ton miles, gives you something to work on. It would take too much space at this time to tell all the good things to be accomplished by handling the forces on the basis of cost ton miles. There are many ways of estimating this; and with it, and a log kept by the despatcher showing the causes of failure to get the maximum work from each engine each day, the causes of delayed traffic, or of unusual occurrences, will permit of your writing a letter any time telling what you are really doing.

For evidence that the trend of the times is back to the old way, look at the Harriman lines with the Hine system, the Rock Island lines with three general managers, the Frisco lines with

"more authority to the station agents" and the Missouri Pacific, which under Mr. Bush has made considerable progress in making "real superintendents."

M. A. W.

PROPOSED CHANGES IN TRAIN RULES.

NASHVILLE, Tenn., June 29, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your editorial of June 28, comment is made upon some of the recommendations of the Train Despatchers' Association concerning revision of the standard code. There are two reasons why Rule 93, as proposed by the despatchers, may not be acceptable: (1) It is not possible with us (the Nashville, Chattanooga & St. Louis) unless the despatching force is increased, to give all yard engines time on delayed passenger trains; nor can the delay which would be incurred by getting such time, or by lying on side tracks, be borne. (2) I do not feel favorably impressed with a rule which requires trains, except those of the first class, to run prepared to stop within half the distance seen to be clear. Rather let us put it right up to trains moving through yards to so run that an accident will not occur. Both crews will claim they were running only 6 or 10 miles an hour, as invariably is claimed now; and accidents will continue.

While it is true that the code is constructed on the theory that what restricts one train also confers superiority upon others addressed that need the help, since there is to be a revision let an effort be made to make the rule so clear that the trainmen, lawyers, jurymen and all will find it impossible to place several different constructions on it. I would word Rule 93 about as follows: "Yard limits will be designated by ———. Within yard limits the main track may be used, clearing the time of first class trains as prescribed by rule, or protecting against such trains as outlined by Rule 99. In approaching or moving within yard limits all trains and engines, except trains of the first class, must govern themselves accordingly." The exclusive use of form 19 is open to objection for the reason that when a train has been cleared, or its engine has passed the train-order signal at proceed, form 31 must be used, as in such a case the despatcher must himself secure the signatures of the conductor and engineman of the train restricted, not depending on the word of an operator. Also, the 31 form must be used when a train is restricted at a blind siding. The 19 form may be safely depended on, perhaps, for all other movements, provided a form of clearance card is used that shows the individual numbers of all orders issued for the train, and provided this is repeated to the despatcher by the operator, and O. K. given, before any order is delivered to the train.

H. W. FORMAN.

The Chinese railway from Canton to Hankow will be 170 miles long and will have a gage of 4 ft. 8½ in. Over 60 miles are in operation. Construction work was delayed on account of the opposition of the villagers along the line.

The Anecho district in the German protectorate of Togoland, Africa, has very valuable oil palm forests, the exploitation of which would render absolutely necessary the construction of a railway line. The negotiations on the subject, up to date, have made plain the necessity for such a railway, the line proposed being from Tsewie to Tokpli. The project has been embodied in the bill for the German budget of 1913.

A concession for the construction of an electrical railway from Galata, Turkey, to Rumeli-Kawak, has been given to Lenz & Company, of Berlin, Germany. After the preliminary work, which will take up a year, the actual work of construction will be begun. It is estimated that this will require a further four years. The line will connect Constantinople's suburb Galata with the Black Sea, at the mouth of the Bosphorus.

TWO RAILWAY EXTENSIONS IN ONTARIO.

History and Construction Details of the Completion of the
Algoma Central & Hudson Bay and the Algoma Eastern.

BY R. S. M'CORMICK,

Chief Engineer, Algoma Central & Hudson Bay and the Algoma Eastern.

ALGOMA CENTRAL & HUDSON BAY.

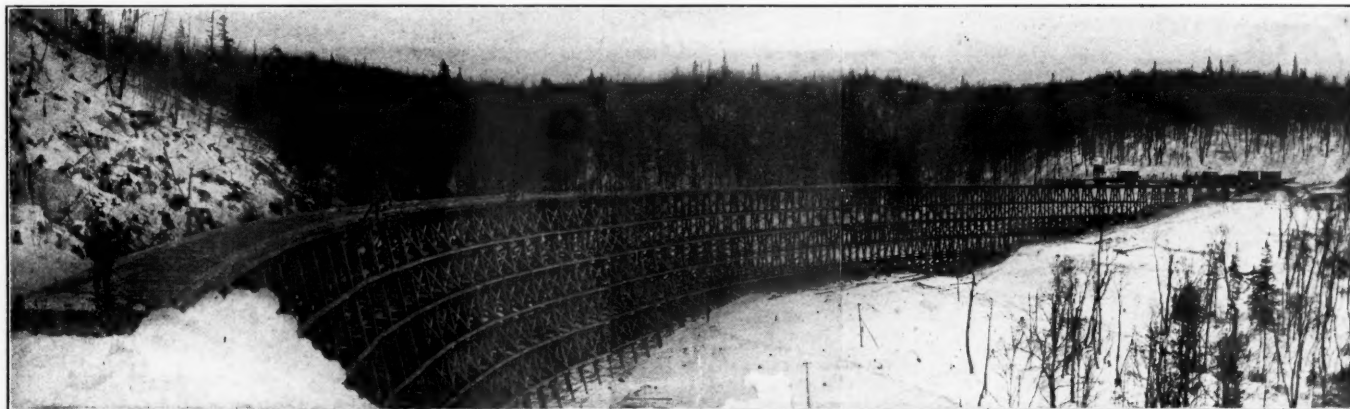
The construction of the Algoma Central & Hudson Bay was begun in the spring of 1900 by the Old Lake Superior Corporation, under the management of F. H. Clergue, a land grant and subsidy being arranged for at that time with the Canadian government. In the spring of 1903 a continuous line had been graded from Sault Ste. Marie, Ont., to Josephine Junction, 170½ miles north, with a line extending down to Lake Superior, at Michipicoten harbor. This section, 20 miles long, was built in 1899-1900 to gain access to valuable iron mines in this territory, owned by the corporation. The grading work on the main line was not completely finished, however, as financial misfortunes overtook the corporation. Track was only laid to a point about 55 miles north of the "Soo." A large number of bridges and trestles between this point and Josephine Junction were not built, but otherwise the line was completed to sub-grade.

Between the years 1903 and 1908 additional track was laid to bring the end of steel at mile 68, no other work being done north of this point, however. In 1909 active measures were

grading in cuts where slides had occurred, bringing up settled embankments, all the bridging (excepting Montreal river), track laying and ballasting.

In the meantime a spur of 9¼ miles long was located from a point 17 miles from Michipicoten harbor on the line extending from the lake to the mines, northerly to a new iron mine known as the Magpie mine. In May, 1910, active work was started on this section. The company also started to repair and re-tie the upper 10 miles of the 20 miles extending from the harbor to Josephine Junction known as the Josephine branch, which had been wholly unused for over eight years. This line was in wretched shape. The ties were rotten, and as very little ballast had originally been used it was necessary to re-ballast the whole section. This work was done with company forces, with some help from the O'Boyle company.

From May, 1910, to August, 1911, the work on the main line, north from mile 68 and south from Josephine Junction, the grading of the Hawk Lake—Hobon section, the building of the Magpie branch and the re-building of the 10 miles of the Josephine branch, proceeded with the usual ups and downs pecu-



Long Trestle on 12-Deg. Curve; A. C. & H. B.

begun by an English syndicate to complete the road, which had, in the meantime, secured control of the Lake Superior Corporation, including the Algoma Steel Company and the railway and other transportation and industrial interests at Sault Ste. Marie. Before undertaking the completion and proposed extension of the railway, a report was made for the management on the whole project by F. H. McGuigan of Toronto. Mr. McGuigan reported favorably on the completion and extension of the line to connect with the National Transcontinental Railway, Canada's new coast to coast railway.

The necessary financial arrangements being successfully completed, the first work undertaken was the locating of a line to connect the old grade near Hawk Lake with the Canadian Pacific. This was accomplished by the location and construction of 30 miles of line from Hawk Lake Junction to Hobon. S. Keemle, locating engineer, Toronto, was in charge of the locating party on this work. A 0.6 per cent. compensated, 6 deg. maximum curve, line was secured at a cost of about \$38,000 per mile complete, including track and structures. In May, 1910, a contract was let to the O'Boyle Bros. Construction Company, of Sault Ste. Marie, for this section, and on July 1 another contract to the same company for the completion of the main line from mile 68 to Josephine Junction, mile 170½, including re-

liar to railway construction work in such a country. Labor was poor and generally scarce, and bush fires, whiskey and all the troubles incident thereto had to be fought continually. By August 1, 1911, the Magpie branch was completed, at a cost of practically \$275,000. The line was built on a 1.5 per cent. compensated grade against the traffic and 2.5 per cent. flat, with the traffic.

The first four and one-half miles from the junction to the crossing of the Magpie river was light work, except for some heavy side cutting descending the slope to cross the river, at which point the adverse grade of 1.5 per cent. compensated, was located. From the river crossing, to the mine the line is heavy, and at mile 7½ there is a timber trestle 900 ft. long, 80 ft. high, located on a 12 deg. curve and a 1.75 per cent. grade. Up to this point the grade is 2 per cent. maximum, from here to the mine site it is 2½ per cent., 12 deg. being the maximum curve. Very large expenditures are being made by the company in opening the mine, and in addition to a plant for treating the siderite ore a model mining town is being built. This branch is laid with 80 lb. A. S. C. E. rail, with tie plates on all curves, and is most substantially built in all respects, except that timber and piles were used in bridging.

On July 15 the sub-contractors on the Hawk Lake—Hobon

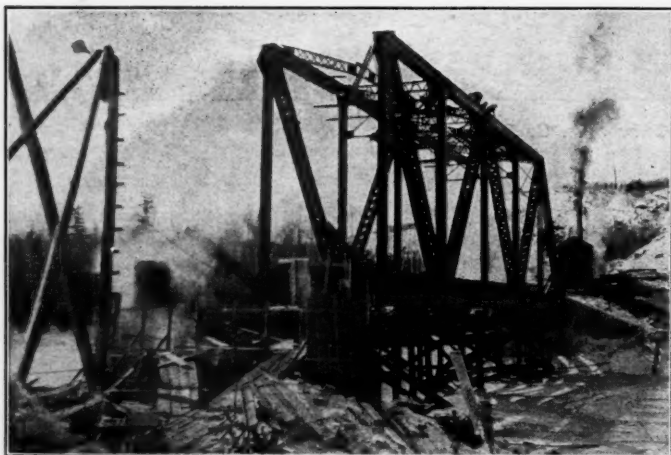
section finished the grading. These sub-contractors were Murdock Brothers on the lower 19 miles, and Cavicchi & Pegano on the upper 11 miles. The work was quite heavy, the grading quantities being 732,933 cu. yds. classified, 261,269 cu. yds. solid rock, 94,378 cu. yds. loose rock, and 377,286 cu. yds. common excavation. In addition there was 20,178 cu. yds. over break in rock cuttings, and overhaul amounting to 1,500,000 cu. yds. About 3,000,000 ft. B. M. of bridge timber, 40,000 lineal feet of piling, 170,000 ft. B. M. of culvert timber, 220,000 lbs. of bridge iron, 291 cu. yds. of dry stone masonry, 423 cu. yds. of cement masonry and other small items were required for this work.



Laying Track on the Snow; A. C. & H. B.

The rock work was exceptionally well done, as the specifications only allowed common excavation for over break, and all the time the work was in progress this was enforced. On final estimate, however, a fair amount of over break was given as solid rock. Track laying and some ballasting was done this year, and the bridge work was completed. On January 10, 1912, track was connected up giving a railway connection from the Canadian Pacific into the mines of the Michipicoten district. Some ballasting was also done this year.

Work on the main line completion progressed slowly from June, 1910, to May, 1911, at which time track had reached the

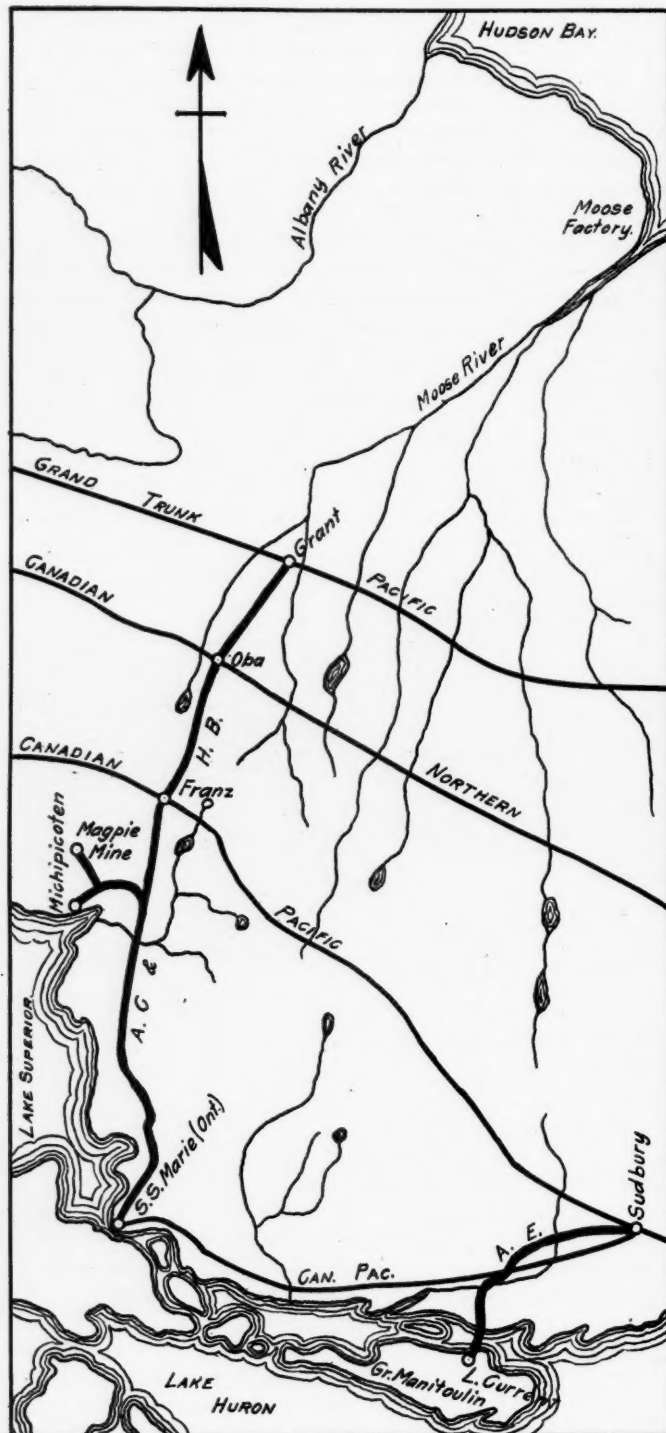


Erection of Bridge at First Crossing of Spanish River; Algoma Eastern.

Montreal river, mile 91½ north of the "Soo." Here a steel viaduct 1,550 ft. long and 130 ft. high located at the head of the falls 150 ft. high had to be built. This viaduct was designed in 1902 by Boller & Hodge, New York, and was erected under contract by the Canadian Bridge Company. There are 1,745 tons of steel in this viaduct, and as the alignment is on a curve at each end, it was a very interesting piece of erection. The viaduct consists of tower girders supported on steel legs with concrete pedestal piers and end abutments. There are 13 30 ft.

and 1 40 ft. tower girders situated on an island in the middle of the river. The intermediate girders consist of 1 85 ft., 5 75 ft., 10 60 ft., and 2 30 ft. spans. The structure is designed under the Dominion government specifications, class 1 loading. Some poor work in concreting the piers requiring their rebuilding, delayed the erection, but track was laid over the viaduct in October, 1911.

In the meantime track laying had progressed on the north end, the gap being closed about the middle of June, 1912. The

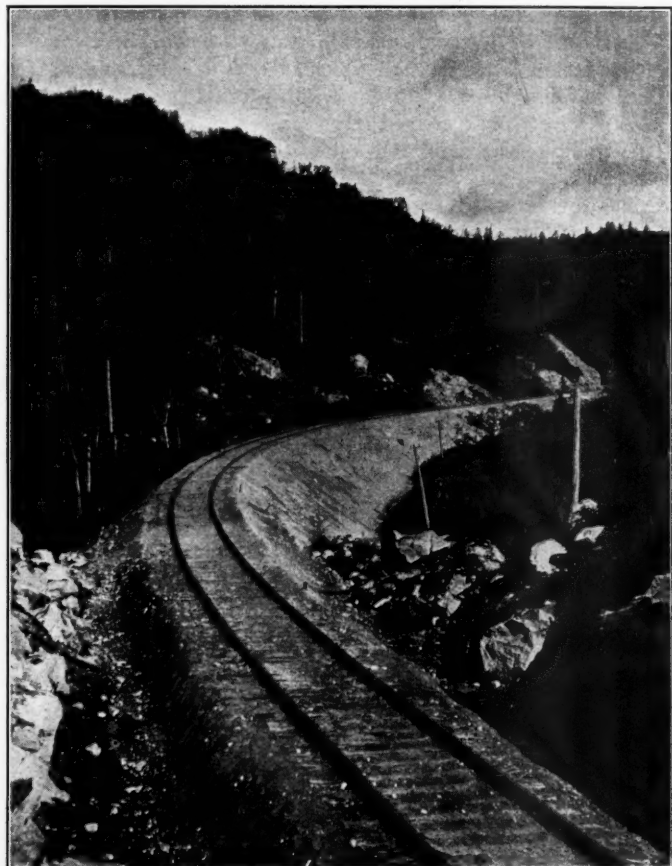


Algoma Central & Hudson Bay and the Algoma Eastern.

slow progress made in track laying is due principally to the excessive amount of bridging and trestling on this line. Between the "Soo" and Josephine Junction there is about 16,000,000 ft. B. M. of bridge timber in 140 structures, besides 100,000 lineal feet of piling. Some of these bridges are very large, and as all the bridge timber used, excepting a few thousand feet cut in

the country, is British Columbia fir, it is necessary to build these bridges from the end of steel.

The old line from Sault Ste. Marie to Hawk Lake Junction is through a most difficult country to build in, and while the location secured was good on the whole, the line is badly handicapped with heavy grades and sharp curvature. To improve this grade and alinement would require extensive re-locating, which for the present is not contemplated. The route, however, is very



Finished Track; A. C. & H. B.

picturesque and travelers have a treat in rugged scenery awaiting them on the opening for traffic of the Algoma Central north of the "Soo."

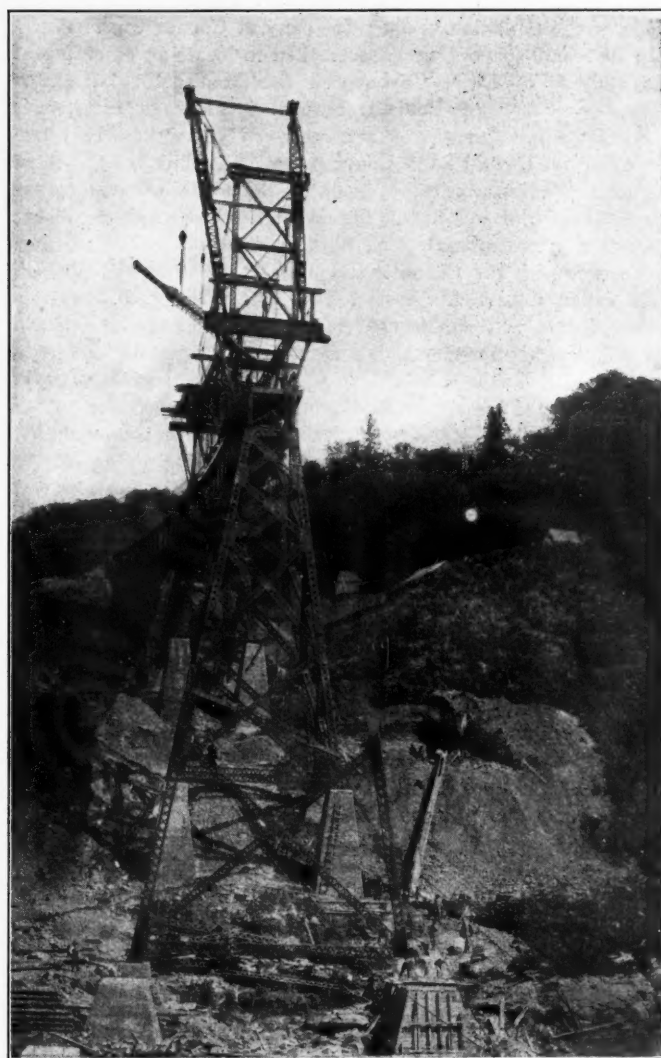
While the above work was progressing south of Hobon, a location was made north to the Transcontinental Railway at the new town of Hearst (or Grant) the first division point west of Cochrane, 101 miles north of the Canadian Pacific. This location is on the same grades and curvature as that of the Hawk Lake-Hobon section, viz., 0.6 per cent. compensated grade and 6 deg. maximum curves. Louis Whitman, locating engineer, had charge of the locating with Sanford Hazelwood and W. H. Wilkie in charge of the parties. The route traversed by this line is through rough country for 30 miles north of the Canadian Pacific, but north of this the line enters the great clay belt of northern Ontario, and the grading work is light. The south 30 miles, however, bring up the average cost of this line to about \$30,000 per mile, including track and structures.

The crossings of the Canadian Pacific and the Canadian Northern Ontario extension (under construction) are made at grade. There are very few bridges on this 100 miles, and none at all of any size excepting a bay crossing of Oba Lake, where four pile trestles were driven, one of them being 1,302 ft. long, with deck 10 ft. above the water. The balance of the bridging consists of pile structures, the largest being the crossing of the Mattawishquie river, 700 ft. long, near Hearst at the junction with the National Transcontinental. The grading quantities on

this 100 miles will be, approximately, 360,000 cu. yds. solid rock, 250,000 cu. yds. loose rock, 1,500,000 common excavation, and 3,500,000 cu. yds. overhaul. About 80,000 lineal feet of piling and 1,500,000 ft. B. M. bridge timber, are required. Corrugated ingot iron pipe is used principally for culverts, there being a few of native timber, but none of concrete. In August, 1911, a contract was let to the Superior Construction Company, Sudbury, Ont., for the construction of this section complete, including grading, bridging, track laying and ballasting. The grading is more than 60 per cent. completed, and track laying was started about June 15 at Hobon. It is expected to reach the Canadian Northern crossing in October, thus placing the Algoma Central in a position to deliver construction material and supplies to the contractors for this line at Oba.

Explorations for extensions of the Algoma Central & Hudson Bay north of the National Transcontinental have been made. A copper metallic circuit telephone line has been constructed from Sault Ste. Marie, through to Michipicoten Harbor and extension to the mines and north to Hobon and Hearst will be made this summer.

At Sault Ste. Marie, new terminals, consisting of a modern



Erecting Steel Viaduct; A. C. & H. B.

engine house, machine shop, store and office building and a new terminal station and office building are all contracted for and the work started. This work involves the expenditure of about \$500,000, and includes an extension of the main line to reach nearer the center of the city of Sault Ste. Marie. A new yard will be built at Tagona, the industrial center, where extensive alterations and additions to the terminal facilities are being

made. The company will also build a large coal and ore dock at Michipicoten Harbor in the near future.

THE ALGOMA EASTERN.

The original charter for the 85 miles of this railway now being completed from Sudbury to Little Current on the Manitoulin Island, was obtained by F. H. Clergue at about the same time the Algoma Central project was launched. As in the case of the latter road a land grant and subsidy accompanied the granting of the charter. Actual construction of the line was delayed from year to year, after the first section of 13 miles, extending from Sudbury to Gertrude Mine, was constructed in 1900-1901. An extension of 10 miles from Gertrude Mine to Crean Hill was built in 1909-10, bringing the end of steel 23 miles west of Sudbury where connection was made with a spur track connecting with the Canadian Pacific at Victoria Mine station. This spur, three miles long, is owned by the Canadian Copper Company and connects the Crean Hill Mine with the Canadian Pacific. This 23 miles of line passes through the famous Sudbury nickel district, the richest deposit in the world. Practically the entire revenue derived from the road's operation is for handling the ore from the Creighton and Crean Hill Mines to the roasting yards of the Canadian Copper Company at Copper Cliff.

In 1909-1910 surveys were undertaken to locate an extension of this railway to Little Current on the Manitoulin Island. A party, in charge of Louis Whitman, locating engineer, was started at Little Current on a route over which the writer had run a line for the old Sault Company in 1900. This line traversed the islands and skirted the shore of the north channel to the mainland at the mouth of the Whitefish river where it cut through a range of high rock hills facing the lake, thence to a connection with the Canadian Pacific at a point on the Spanish river called Espanola. A section of $1\frac{1}{2}$ miles of this original surveyed line was constructed in 1901 connecting the Spanish River Pulp & Paper Company's plant on the Spanish river with the Canadian Pacific Sault branch. This little section of spur was constructed by the Sault Company and turned over to the Canadian Pacific to operate, under an agreement contemplating the ultimate completion of the whole project.

When the writer took charge of the work, a location was pushed through to connect with the Sudbury end at Crean Hill, a distance of 62 miles from Little Current line with a maximum 1.25 per cent. compensated grade and maximum 11 deg. curves (with a 12 deg. curve near Whitefish) was secured at a cost of about \$32,000 per mile complete including track, ballast and building. In July, 1910, a contract was let to the O'Boyle Bros. Construction Company for building the 20 mile section from Little Current to the main shore at Whitefish and in March, 1911, another contract was let to the Superior Construction Company for the balance of the work from Whitefish to Cream Hill, 42 miles. The grading work on this 62 miles is practically complete and track laying has just been started at Espanola. The 62 miles of track will be laid and ballasted about October 30, next.

The country traversed by this railway is almost wholly unsettled and south of Espanola is very rugged. From the Whitefish river to Little Current the scenery is most picturesque as the line here follows close to the water and winds around the headlands and bays of that section of the North Channel known as the Bay of Islands. The grading on this section, while practically all solid rock, was not excessive in cost, averaging about \$20,000 per mile including bridging. From Espanola easterly to the junction with the old line at Crean Hill the line passes over a better country, but, from an agricultural point of view, of little value.

An under crossing of the Canadian Pacific Sault branch is obtained near the village of Nairn Center, the Canadian Pacific tracks being carried over the Algoma Eastern on a 27 ft. 7 in. skewed deck plate girder span on concrete wing abutments. The bridging on the entire line from Sudbury to Little Current is

light for such a country. The steel structures consist of one 105 ft. and one 60 ft. deck plate girder span on stone abutments and center pier at the Vermillion river crossing, 17 miles west of Sudbury, one 180 ft. through riveted truss span at the Spanish river crossing, mile 42, one 176 ft. through riveted truss span at the second crossing of the Spanish river at Espanola (built in 1901) and two 100 ft. girder spans at two other points together with a 36 ft. deck girder span on concrete at an overhead crossing of the government trunk road near Espanola. These major structures are supplemented by a number of timber trestles and pile bridges. At Little Current, in order to cross the channel, in front of the town, through which there is considerable vessel traffic, a bridge, some 600 ft. long with a draw span is required. This structure will be erected this year.

The traffic expected for this railway consists of ore, pulp and paper, coal and the products of the Manitoulin Island, which previous to the construction of this line, was entirely dependent on water communication with the main land. This island is 90 miles long averaging 8 to 12 miles wide and is capable of great development. The population at present is about 20,000 and at least one half of the island is fine agricultural land, particularly adapted to hay and stock raising. The construction of the Algoma Eastern formerly known as the Manitoulin & North Shore Railway has been most eagerly looked forward to for years by the Manitoulin Islanders.

The above work has all been in charge of the writer, as chief engineer of both roads. On the Algoma Central & Hudson Bay G. F. Horsey and C. Le B. Miles are in charge of the work at the north end and L. C. Maxwell and J. A. Hedgecock at the south end as division engineers. B. E. Barnhill is division engineer of the Algoma Eastern with headquarters at Sudbury. W. C. Franz is general manager and G. A. Montgomery superintendent of both roads.

RECONSTRUCTION OF THE PANAMA RAILROAD.

The reconstruction of the Panama Railroad, described in the *Railway Age Gazette* of February 11, 1910, and February 16, 1912, is practically completed. Freight traffic was to be opened over the new line June 1, although the passenger business will continue to be handled over the old line until after the completion of the canal. The following facts as to the cost of the work of reconstruction and the present and prospective traffic are taken from a report of a hearing held on the Canal Zone in December, 1911, by the House of Representatives Committee on Interstate and Foreign Commerce. Col. George W. Goethals, president; Lieut. Frederick Mears, chief engineer, and John A. Smith, general superintendent, of the Panama Railroad, were the principal witnesses.

The original railway across the Isthmus of Panama was completed in 1855, the construction work being carried out by a company of Americans. The line was built to light standards, 56 lb. rail being laid. The cost of the $47\frac{3}{4}$ miles between terminals was about \$8,000,000, or \$167,000 per mile. The French Canal Company later acquired a controlling interest in the stock of the corporation and operated the road until 1904, when it was taken over by the United States government. Since that time the commercial business handled over the line has very greatly increased, until at present the tonnage exclusive of that handled for the Canal Commission in connection with the work of building the canal would make the railway profitable to operate. The freight tonnage handled during 1910 and 1911 was as follows:

Colon to Panama, 1910, 991,856 tons; 1911, 1,178,560 tons; Panama to Colon, 1910, 280,361 tons; 1911, 378,470 tons. These figures seem to show a total freight traffic density of 1,557,030 ton miles per mile of road, but the railway's annual report gives the freight density as 1,186,344 ton miles, and the passenger

density as 566,763. The operating revenue for the year 1911 was as follows:

From transportation:	
Colon to Panama:	
Freight	\$1,738,409.72
Passenger	346,345.37
Other service....	199,845.53
	<u>\$2,284,600.62</u>
Panama to Colon:	
Freight	\$659,768.16
Passenger	340,645.88
Other service....	75,623.68
	<u>1,076,037.72</u>
Switching	3,887.50
Total revenue from transportation.....	\$3,364,525.84
Miscellaneous revenue, other than transportation	369,330.31
Harbor terminal revenue	415,588.51
	<u>\$4,149,444.66</u>
Total railroad revenue	1,860,110.86
Total steamship line revenue.....	\$6,009,555.52

The rates for passenger service are divided into two classes, the second class charge being two cents a mile, and first class five cents a mile. Employees of the Canal Commission are furnished one pass a month and the members of their families are granted half rates. About \$10,000 a year is derived from these employees. The commission pays the railway a lump sum per month for handling freight business, although when the line was originally taken over a rate of \$2.25 a ton was in use. For the total tonnage of 783,834 tons handled for the commission during 1911 the railway received on the monthly sum basis \$506,600, although at the rate of \$2.25 a ton this revenue would have amounted to \$1,763,626.

The operation of the railway will be necessary after the opening of the canal. Practically all of the supplies for the operation of locks and for the use of employees along the line of the canal will come to the Atlantic terminals and will have to be transported across the Canal Zone. It is expected that a large body of troops will be stationed on the isthmus and the railway will be necessary for the transfer of this force. A considerable passenger traffic, both local and through tourist, is expected to continue even after the canal is opened, and there will be a certain amount of local freight to be handled between towns along the canal. The question as to the amount of through freight business between terminal ports that will develop after the canal is put in operation is a mooted one. Many railway men think that the Panama Railroad will be an important factor in the transfer of freight. The steamship interests, however, claim that there can be little or no transfer of freight by rail, but that warehouses should be provided at the terminals and an agreement entered into by the steamship interests by which all freight will be transferred by the steamship lines themselves. It is sometimes argued that a considerable tonnage of split cargoes will be handled by the railway. If, for instance, a steamer coming to the Atlantic side has some little freight for a point on the Pacific coast, and there is a line of steamers running up and down the Pacific coast that do not come through the canal this freight might have to be transferred by the railway, although it seems probable that if any other line of steamers which passed through the canal also reached the Pacific ports, such business would be carried by them. The expense of transferring from boat to rail would be too great to allow such a method to compete with a line of steamers operating through the canal. It has not yet been determined how the railway will be operated after the canal is completed. Col. Goethals in his testimony, volunteered the opinion that "the railway, being a necessary adjunct to the canal and being unable to make a living commercially," should be operated as a part of the canal so that the railway organization may be reduced to a minimum.

The construction of the canal rendered necessary the relocation of 42 miles of line which has been built to a high standard of construction, the track being laid with 90 lb. rails and 3,000 ties to a mile. The ties are of hard wood or creosoted soft wood and ties, plates, screw spikes and manganese frogs and switch points are standard. This type of construction is justified on the ground that a lighter track would involve very much higher maintenance charges. The climatic conditions are

such as to make maintenance very difficult, and a heavy track structure is necessary to prevent serious damage being done by the continued wet season, followed by a continued dry season. The quantities of work done on the relocated line up to the date of the hearing are shown in the following table:

Excavation (prism of cut):	
Earth	2,768,230 cu. yds.
Loose rock.....	455,500 cu. yds.
Solid rock	1,926,265 cu. yds.
Borrow	3,801,401 cu. yds.
Wet earth	2,642 cu. yds.
Total	8,954,038 cu. yds.
Embankment:	
From canal	4,990,224 cu. yds.
Total embankment (waste included).....	14,811,317 cu. yds.
Masonry (concrete):	
Class A	7,069.07 cu. yds.
Class B	44,210.48 cu. yds.
Class C	11,281.81 cu. yds.
Rubble in cement.....	260.99 cu. yds.
Rubble, dry	460.00 cu. yds.
Riprap	15.97 cu. yds.
Reinforcing iron	3,211.92 tons
Grillage piles	103,825 lin. ft.
Trestle:	
Temporary—	
Lumber	5,069.28 M ft. b.m.
Piles	1,216,318 lin. ft.
Permanent—	
Lumber	14.03 M ft. b.m.
Piles	2,520 lin. ft.
Track:	
Temporary—	
30-lb. rail	7,288 lin. ft.
Ties, 6 in. x 8 in. x 8 ft.....	106,327
70-lb. rail	371,045 lin. ft.
Permanent—	
Ballast	78,598 cu. yds.
Ties	94,814
70-lb. rail	269,201 lin. ft.
90-lb. rail	84,086 lin. ft.
Pipe:	
Tile (6-in.)	1,630
Cast iron	2,194
Galvanized iron—	
12-in.	32
16-in.	416
20-in.	210
24-in.	931
36-in.	156
Vitrified clay—	
10-in.	667
16-in.	2,501
24-in.	5,397
30-in.	2,461
36-in.	38
Wooden culverts	31,555 ft. b.m.
Steel in bridges	1,244.25 tons
Miscellaneous structures	700,180 ft. b.m.

These figures show that the excavation averaged 213,191 yds. to the mile, and the embankment 352,650 yds. to the mile, which is one reason for the very high cost of the line. The country was very rough, and a maximum grade of 1.25 per cent. compensated was used. The average amount of ballast used on each mile was 1,871 yds. The cost of the work up to November 1, 1911, is shown in the following table:

Engineering	\$312,654.54
Right of way and station grounds.....	1,353.66
Real estate	109.04
Grading, temporary tracks and structures.....	5,607,692.66
Tunnels	213,275.34
Permanent bridges, trestles and culverts.....	912,330.80
Ties (cost of)	86,191.73
Rails (cost of)	118,796.79
Fastenings (cost of)	34,304.75
Frogs and switches (cost of).....	5,246.81
Ballast (cost of and unloading).....	43,361.36
Laying permanent tracks.....	137,453.06
Fencing right of way.....	1,373.94
Crossings, cattle guards and signs.....	7,086.48
Interlocking and signals.....	6,710.83
Telegraph and telephone lines.....	51,353.02
Permanent station buildings.....	33,457.77
Miscellaneous structures	16,317.13
General expenses	15,729.63
Total	\$7,604,799.34

It is estimated that the cost of completing the work will increase the total given above to about \$9,500,000, or \$226,190 per mile. Unit costs based on the figures in this table up to November 1, 1911, are as follows:

Grading, temporary tracks and structures.....	\$133,516 per mile
Permanent bridges, trestles and culverts.....	21,722 per mile
Track, complete above subgrade.....	10,127 per mile
Ballast	1,032 per mile
Tracklaying	3,272 per mile

LOCOMOTIVE BOILER FLUE GAS ANALYSIS.

Simple Method of Finding the Weight of the Gases and of Dividing the Boiler Efficiency Into Its Component Parts.

BY LAWFORD H. FRY.

A previous article* showed that in examining the efficiency of a locomotive boiler a knowledge of the weight of the smoke-box gases is desirable. A method for obtaining this and other useful information from an analysis of the flue gases will now be described in detail. The methods of calculation and the reasoning on which these are based will be described concisely, but at the same time the explanations will be made as simple as possible, so that they may be followed without any profound knowledge of chemistry.

The information to be obtained by the calculations is three-fold:

First, what proportion of the coal fired escapes entirely unburned?

Second, with what efficiency does the coal burned produce heat?

Third, what proportion of the heat produced is taken up by the boiler?

The answers to the first two questions determine the efficiency of heat production, or the firebox efficiency; while the answer to the third gives the efficiency of the heat absorption, or the heating surface efficiency.

First, consider the process of combustion, in which the oxygen of the air combines with the hydrogen and with the carbon of the coal. The combination of the oxygen and carbon may occur in two ways. Expressed chemically, one method of combination is for one molecule of carbon, C, to combine with two molecules of oxygen, O, to produce one molecule of carbon dioxide CO₂. The molecule is a chemical measure which it is convenient to use for the present, but all calculations will be carried out in the usual engineering units. This process of combination may be represented by the chemical equation



The other method of combination of oxygen and carbon is for one molecule of carbon to combine with one molecule of oxygen to form one molecule of carbon monoxide, CO. This is represented by the equation



The first process is the most efficient in producing heat, each pound of carbon giving 14,540 B. t. u. when burned to carbon dioxide, CO₂, and only 4,360 B. t. u. when burned to carbon monoxide, CO. There is therefore a loss of 10,180 B. t. u. for each pound of carbon from which CO is produced, and hence every effort should be made to produce CO₂ and not CO.

Now the weights of a molecule of carbon and of a molecule of oxygen are in the proportion of 12 to 16, and hence equation (1) shows that 12 parts by weight of carbon combine with $2 \times 16 = 32$ parts of oxygen to form $12 + 32 = 44$ parts of carbon dioxide. In other words to burn 12 lbs. of carbon to CO₂, 32 lbs. of oxygen are required and 44 lbs. of carbon dioxide are formed. That is, one pound of oxygen combines with $\frac{12}{32}$

0.375 lbs. of carbon to produce $\frac{44}{32} = 1.375$ lbs. of CO₂.

Though the weight of the CO₂, or in fact of any chemical product, is the sum of the weights of the elements which combine, the same is not true of the volumes. The oxygen takes up the carbon to form CO₂ without change of volume, so that the volume of the carbon dioxide is the same as that of the oxygen which goes to form it. Consequently the production of one cubic foot of CO₂ requires one cubic foot of oxygen. This weighs 0.0888 lbs., and hence, as CO₂ is being produced, requires $0.0888 \times 0.375 = 0.0332$ lbs. of carbon. That is to say 0.0332 lbs. of

carbon burned in one cubic foot of oxygen produces one cubic foot of CO₂.

Turning now to the conditions of combustion which produce carbon monoxide. Equation (2) and the molecular weights show that 12 lbs. of carbon combine with 16 lbs. of oxygen to form 28 lbs. of CO. Hence one pound of oxygen burns with $\frac{12}{16} = 0.75$ lbs. of carbon to form $\frac{28}{16} = 1.75$ lbs. of carbon monoxide.

The volume of the carbon monoxide is twice that of the oxygen which goes to form it, so that for the production of one cubic foot of CO, 0.5 cu. ft. of oxygen is required. As the weight of this oxygen is 0.0444 lbs., it requires, for the production of CO, $0.0444 \times 0.75 = 0.0332$ lbs. of carbon. Hence 0.0332 lbs. of carbon burnt with 0.5 cu. ft. of oxygen produces one cubic foot of CO.

Now suppose that analysis shows that in 100 cu. ft. of the flue gases there are A cu. ft. of carbon dioxide, CO₂, and B cu. ft. of carbon monoxide, CO. The production of A cu. ft. of CO₂ requires A cu. ft. of oxygen and $0.0332 \times A$ lbs. of carbon, while the production of B cu. ft. of CO requires 0.5 B cu. ft. of oxygen and $0.0332 \times B$ lbs. of carbon. Hence the A cu. ft. of CO₂ and B cu. ft. of CO are the result of burning $0.0332 (A + B)$ lbs. of carbon in $(A + 0.5B)$ cu. ft. of oxygen. Now in the atmosphere each cubic foot of oxygen is mixed with 3.76 cu. ft. of nitrogen, making 4.76 cu. ft. of air, so that for the above products 4.76 $(A + 0.5B)$ cu. ft. of air are required.

The proportion of air to carbon is therefore

$$\frac{4.76 (A + 0.5B) \text{ cu. ft., or } 4.76 \times 0.0808 (A + 0.5B) = 0.384 (A + 0.5B) \text{ lbs. of air}^* \text{ to } 0.0332 (A + B) \text{ lbs. of carbon or } 0.384 (A + 0.5B)}{0.0332 (A + B)} = 11.52 \frac{A + 0.5B}{A + B} \text{ lbs. of air per pound of carbon.}^\dagger$$

*One cubic foot of air weighs 0.0808 lbs.

†It will be seen that if no CO is produced B will be zero and 11.52 lbs. of air will be used per pound of carbon, CO₂ being alone produced. If on the other hand no CO₂ is produced A will be zero and 5.56 lbs. of air will be used, CO being the only product of combustion.

With this proportion of air to carbon all of the oxygen combines with the carbon. If free oxygen is found in the smoke-box gases it shows that more air than could be used in burning the carbon has been admitted to the furnace. Each cubic foot of oxygen corresponds to 4.76 cu. ft. or 0.384 lbs. of air. Hence if 100 cu. ft. of the products of combustion contain M cu. ft. of oxygen in addition to A cu. ft. of CO₂ and B cu. ft. of CO, the amount of air put into the furnace must have been $0.384 (A + 0.5B) + 0.384 M$ lbs., while as before the weight of carbon burned is $0.0332 (A + B)$. This is in the proportion of $11.52 \times \frac{A + 0.5B + M}{A + B}$ lbs. of air per pound of carbon.

In addition to the carbon the hydrogen of the coal is burnt, but this is a simpler process. Each pound of hydrogen combines with 8 lbs. of oxygen to produce 9 lbs. of water vapor. As each pound of oxygen in the air is mixed with 3.35 lbs. of nitrogen, each pound of hydrogen requires $8 \times 4.35 = 34.8$ lbs. of air and introduces $8 \times 3.35 = 26.8$ lbs. of nitrogen into the products of combustion. Now consider the application of the foregoing to an actual case and examine the conditions under which the dry coal and the dry products of combustion have the following analyses:

Analysis of Dry Coal by Weight.	Per Cent.	Analysis of Dry Smoke-Box Gases by Volume.	Per Cent.
Carbon (C)	83.0	Carbon dioxide (CO ₂) A.....	12.0
Hydrogen (H)	5.0	Carbon monoxide (CO) B.....	0.4
Oxygen (O)	3.5	Free oxygen (O ₂) M.....	6.0
Nitrogen (N)	1.0	Nitrogen (N)	81.6
Ash (A)	7.5		
Total	100.0	Total	100.0

*Railway Age Gazette, June 21, 1912, page 1536.

The air consumed per pound of carbon burned is

$$11.52 \frac{12.0 + 0.5 \times 0.4 + 6.0}{12.0 + 0.4} = 11.52 \times \frac{18.2}{12.4} = 16.9 \text{ lbs.}$$

and as each pound of coal contains 0.83 lbs. of carbon the air required for the combustion of this element is $0.83 \times 16.9 = 14.0$ lbs. per lb. of coal burned. In each pound of coal 0.05 lbs. of hydrogen are found, requiring for combustion $8 \times 0.05 = 0.40$ lbs. of oxygen. As the pound of coal contains in itself 0.035 lbs. of oxygen, it is only necessary to take from the atmosphere $0.40 - 0.035 = 0.365$ lbs. of oxygen corresponding to $0.365 \times 4.35 = 1.585$ lbs. of air and $0.365 \times 3.35 = 1.220$ lbs. of nitrogen. Now the dry products of combustion are composed of the carbon in the coal and the air used in its combustion, together with the nitrogen of the air used to burn the hydrogen, and the nitrogen in the coal. Hence for each pound of coal burned the weight of the dry products of combustion will be:

Carbon	0.83 lbs.
Air for combustion of carbon	14.00 lbs.
Nitrogen from combustion of hydrogen	1.22 lbs.
Nitrogen in coal	0.01 lbs.
Total	16.06 lbs.

This examination of the amount of air employed in combustion, and the determination therefrom of the weight of the dry smoke-box gases, is given for the sake of completeness, but for practical work I have developed a much simpler method of calculation. I find that with the analyses obtained in locomotive practice it is permissible to take the weight of 100 cu. ft. of dry smoke-box gases, as 8.30 lbs. Now, 100 cu. ft. of dry gas has been seen to result from the combustion of $0.0332 (A + B)$ lbs. of carbon, and hence for each pound of carbon burned $\frac{8.30}{0.0332 (A + B)} = \frac{250}{A + B}$ lbs. of dry gas will be produced. In the present case each pound of carbon burned will produce $\frac{250}{12.0 + 0.4} = 20.1$ lbs. of dry gas, and as each pound of coal contains 83 per cent. of carbon the weight of dry gases per pound of coal will be $20.1 \times 0.83 = 16.7$ lbs. The result is not quite the same as that obtained by the other method, but both methods have about equal claims to accuracy, and the difference between the results will not exceed the probable experimental error.

In addition to the above dry products of combustion the flue gases will contain the water vapor produced by the combustion of the hydrogen and that due to the moisture in the coal and air. Under the conditions assumed above the hydrogen produces nine times its weight, or 0.45 lbs. of water per lb. of coal burned, and if the moisture from the air be 1 per cent. of the weight of the coal, the total weight of water will be $0.45 + 0.01 = 0.46$ lbs. per lb. of coal burned. This water vapor leaves the smokebox in the form of highly superheated steam, and thus carries off the heat required for its evaporation and superheating. If the smoke-box temperature be 700 deg. F., and the temperature of the water on entering the firebox is 70 deg. F., the heat required per lb. will be $212 - 70 = 142$ B. t. u. to raise it to boiling point, 966 B. t. u. for evaporation, and, say, 0.48 (700-212) = $0.48 \times 488 = 234$ B. t. u. for superheating, making a total of $142 + 966 + 234 = 1,302$ B. t. u. per lb. of moisture, or $0.46 \times 1,302 = 600$ B. t. u. per lb. of coal fired.

As the specific heat of the dry products of combustion in the smokebox is approximately 0.24, the heat carried by them under the conditions assumed above will be $16.06 \times 0.24 \times (700-70) = 2,420$ B. t. u. per lb. of coal burned. If the coal has a heating value of 14,500 B. t. u., the 600 B. t. u. carried by the water vapor will be 4.1 per cent., and the 2,420 B. t. u. carried by the dry gases, 16.7 per cent., or a total of 20.8 per cent. of the heat of each pound of coal burned will be carried off in the smokebox gases.

Now consider the production of the heat. In the first place the appearance of CO instead of CO₂ entails a loss, amounting as seen, to 10,180 B. t. u. per lb. of carbon burned to CO; when the smokebox gases contain *A* cu. ft. of CO₂ and *B* cu. ft. of CO

per 100 cu. ft., it has been seen that $0.0332 \times A$ lbs. of carbon are burned to produce the CO₂ and $0.0332 \times B$ lbs. of carbon to produce the CO, so that the fraction of the total carbon which

is burnt to CO is $\frac{0.0332 B}{0.0332 (A + B)} = \frac{B}{A + B}$, and the loss on

each lb. burned is $10,180 \frac{B}{A + B}$ B. t. u., or in the present case $10,180 \frac{0.4}{12.0 + 0.4} = 328$ B. t. u. per lb. of carbon, or $0.83 \times 328 =$

272 B. t. u. per lb. of coal burned. This is 1.9 per cent. of the heating value of the coal, and consequently only $100 - 1.9 = 98.1$ per cent. of the heating value of the coal burned is effective in the firebox. It has also been seen that 20.8 per cent. of the heating value of the coal burned is carried away by the smoke-box gases. The remainder $98.1 - 20.8 = 77.3$ per cent. of the heat of the coal burned is to be accounted for by the heat lost by reason of moisture in the coal, by the heat employed in evaporation, and by the heat lost by external radiation, leakage of steam, etc. The loss due to the moisture in the coal is a very small quantity, which is usually negligible in practice, and is only considered here for the sake of completeness.

As before stated, each pound of moisture carries 1,302 B. t. u. out of the smokebox. Hence, if the coal fired contains 4 per cent. of its own weight of moisture, this will cause a loss of $0.04 \times 1,302 = 52$ B. t. u., or 0.36 per cent. of the heating value of the coal fired.* The heat employed in evaporation is easily determined from the weight and temperature of the steam produced. For the present case suppose it to amount to 65 per cent. of the heat in the coal fired, and suppose that the heat lost by external radiation, etc., is 3 per cent. of the heat of the coal fired. Then the heat taken up by the heating surface, which was shown to be 77.3 per cent. of that of the coal burned, is the same as $65 + 3 + 0.36 = 68.36$ per cent. of the heat of the coal fired. Hence 1 per cent. of the coal burned is equivalent to $\frac{68.36}{77.3} = 0.884$ per cent. of that fired, so that the total heat in the coal burned is 88.4 per cent. of that of the coal fired, while $100 - 88.4 = 11.6$ per cent. of the heat of the coal fired is lost by the escape of unburned combustible. We have now determined the distribution of the heat of the coal fired to be:

	Per cent. of the heat in coal fired.
Heat employed in evaporation	65.00
Heat lost by external radiation, etc.	3.00
Heat lost by moisture in coal fired	0.36
Heat lost by coal escaping unburned	11.60
Heat lost by production of CO: 1.9 per cent. of heat of coal burned = $1.9 \times 0.884 =$	1.68
Heat lost in dry gases of combustion: 16.7 per cent. of heat of coal burned = $16.7 \times 0.884 =$	14.74
Heat lost in water of combustion: 4.1 per cent. of heat of coal burned = $4.1 \times 0.884 =$	3.62
Total	100.00

Grouping these items in another way we have:

	Per Cent.
Heat in coal fired	100.00
Heat lost by coal escaping unburned	11.6 per cent.
Heat lost by production of CO	1.68 per cent.
Heat actually produced in firebox	86.72
Heat lost by moisture in coal	0.36 per cent.
Heat lost by water of combustion	3.62 per cent.
Heat lost by dry gases of combustion	14.74 per cent.
Heat taken up by heating surface	68.00
Heat lost by external radiation	3.00
Heat effectively used in evaporation	65.00

From this it follows that the heat actually produced being 86.72 per cent., and the heat taken up by the heating surface 68 per cent. of that of the coal fired, the heat taken up is $100 \times \frac{68}{86.72} = 77.2$ per cent. of that produced. Hence the ef-

ficiency of the combustion is found to be 86.72 per cent., the efficiency of heat absorption 77.2 per cent., and the over-all boiler efficiency 65 per cent. To collect the information which has been

*Note that hitherto we have been referring the heat losses to the coal actually burned. We now begin to refer to the coal fired, and the relation between coal fired and coal burned will be determined.

obtained, in convenient form for reference, and for general use, it will now be briefly summed up and put into the shape of formulae. If the coal and flue gas analyses are:

Analysis of Dry Coal by Weight.		Analysis of Dry Flue Gases by Volume.	
	Per Cent.		Per Cent.
Carbon	C_1	Carbon dioxide (CO_2)	A
Hydrogen	H_1	Carbon monoxide (CO)	B
Oxygen	O_1	Oxygen (O)	M
Nitrogen	N_1	Nitrogen (N)	D
Ash	As_1		
Total	100.00	Total	100.00

If the heating value of the dry coal be K , B. t. u. per lb.; the temperature of the smokebox ts , deg. F., and the temperature of the air ta deg. F. Then the weight of air supplied per lb. of coal actually burned will be:

$$Ac = 11.32 \times \frac{A + 0.5B + M}{A + B} \times \frac{C_1}{100} \quad (3)$$

and the nitrogen left from the combustion of the hydrogen per lb. of coal burned will be:

$$Nhc = 0.0335 (8 H_1 - O_1) \quad (4)$$

The total weight of dry products of combustion per lb. of dry coal burned will be:

$$Wg = \frac{C_1}{100} + \frac{N_1}{100} + Ac + Nhc \quad (5)$$

that is, the sum of the carbon and nitrogen of the coal, together with the air passed through the fire to burn the carbon and to provide the free oxygen, and the nitrogen left from the combustion of the hydrogen; or by the approximate method described above the weight of the dry products of combustion per lb. of coal burned will be

$$Wg = 2.5 \frac{C_1}{A + B} \quad (5a)$$

The dry gases escape at the smoke-box temperature and the specific heat being taken as 0.24, the consequent loss of heat expressed as a percentage of the heat of the coal burned is:

$$Bw_1 = \frac{24 (ts - ta) Wg}{K} \quad (6)$$

The water vapor produced by the combustion of the hydrogen per lb. of coal is:

$$Wm = 9 H_1 \quad (7)$$

and the heat lost by the escape of this vapor at the smoke-box temperature as a percentage of the heating value of the coal burned is:

$$Bv_1 = \frac{9 H_1}{K} (1076 + 0.48 ts - ta) \quad (8)$$

Further losses are incurred by the escape of the water vapor produced from the moisture of the air and of the coal, but unless the amount of this moisture is excessive, say over 10 per cent. of the weight of the coal, the loss thus produced is negligible. Then the loss in the products of combustion, wet and dry, expressed as a percentage of the heat of the coal burned is $Bw_1 + Bv_1$.

The loss of heat production due to the formation of CO , if expressed as a percentage of the heat of the coal burned is

$$U_1 = 10,180 \frac{B}{A + B} \times \frac{C_1}{K_1} \quad (9)$$

Again if P_2 per cent. of the coal fired escapes unburned, the coal burned will be $(100 - P_2)$ per cent. of that fired. Of this coal burned it has been seen that U_1 per cent. of the heat is lost in the production of CO and $Bw_1 + Bv_1$ per cent. is carried off in the products of combustion, so that the remainder, which is taken up by the heating surface, is $100 - U_1 - Bw_1 - Bv_1$ per cent. of the heat of the coal burned, or $\frac{100 - P_2}{100} (100 - U_1 - Bw_1 - Bv_1)$ per cent. of the heat of the coal fired.

*The subscript 1 is used for quantities which are expressed as a percentage of the heat in the coal burned, while the subscript 2 is used where the quantities are expressed as percentages of the heat in the coal fired.

On the other hand if, as may be ascertained by measurement, T_2 per cent. of the heat of the coal fired is utilized in evaporating the water, and R_2 per cent. is lost by external radiation and leakage, $T_2 + R_2$ per cent. of the heat of the coal fired is taken up by the boiler, and this can be equated to the expression above.

$$\text{Then } T_2 + R_2 = \frac{100 - P_2}{100} (100 - U_1 - Bv_1 - Bw_1)$$

$$\text{and } 100 - P_2 = \frac{100 (T_2 + R_2)}{100 - U_1 - Bv_1 - Bw_1} \quad (10)$$

and since all of the quantities except P_2 can be calculated from the foregoing or measured, equation (10) enables P_2 , that is the coal lost unburned, to be calculated. It may be noted that in practice it is not easy to measure R_2 , that is the percentage of heat lost by external radiation, leakage, etc., but it is certain that no great error will be made if it is assumed to be 5 per cent. of T_2 , the heat used in the production of the steam. With this assumption equation (10) gives an easy method of arriving at the value of P_2 , a quantity which is far from easy of direct measurement. To obtain a complete account of the heat of the coal fired it is only necessary to multiply U_1 , Bv_1 and Bw_1 by $\frac{100 - P_2}{100}$ to express the losses represented by these symbols as

percentages of the heat of the coal fired.

The previous article showed a practical application of the methods of analysis which have since been described, and a little consideration will show that this is only one instance out of many of the advantages to be derived from a study of locomotive tests in which flue gas analyses are made. At present the published information regarding tests of this description is strictly limited, but in view of the importance of the information to be obtained it is to be hoped that the taking of flue gas analyses will soon come to be a regular part of any locomotive test. A simple method of sampling for such analyses during a road test was described by Dr. F. J. Brislee before the Institution of Mechanical Engineers in London, on March 27, 1908. A 1-in. iron tube was run horizontally across the center of the smokebox in front of the exhaust pipe. The end of the tube inside the smokebox, was closed, and a saw cut about an $\frac{1}{8}$ in. wide was made along the tube on the side nearest the boiler flues. Outside the smokebox the tube connected to a $\frac{1}{2}$ in. pipe which led along the handrail back of the cab. The gases were drawn into the tube and back to the cab by means of a bellows type of aspirator, and after being filtered through asbestos fiber were collected in glass tubes of about 100 cubic centimeters (6.1 cu. in.) capacity, fitted at each end with a well ground glass tap. With an apparatus of this description it is easy to take samples of gas at intervals throughout a locomotive test and to have them analyzed at the end of the run. In this way much valuable information regarding the conditions of combustion can be obtained.

A French newspaper gives an account of a proposed railway which will start at Tangiers, Morocco, and run along the coast of the Mediterranean, then turn inland to Fez, cross the Little Atlas range by a pass nearly 4,000 ft. above sea level, traverse the Sahara desert and run through the French Congo via Lake Tchad, and after crossing the Nile and a couple of mountain ranges, terminate at Juba, on the coast of British East Africa. It is needless to say that the realization of such a line is still very far off. The newspaper account goes on to say that electricity would be the motive power and that the current would be obtained from water falls near Lake Tchad. A connection with the European railway system by means of train ferries between Tangiers and Tarifa, Spain, is also discussed as a possibility. If ever completed, this line would link up with the French railways in Morocco, Senegal, the Ivory Coast and the Congo to the great benefit of French colonial trade. It is estimated that the line would cost \$200,000,000.

ORNAMENTATION OF A CONCRETE FACIA GIRDER.

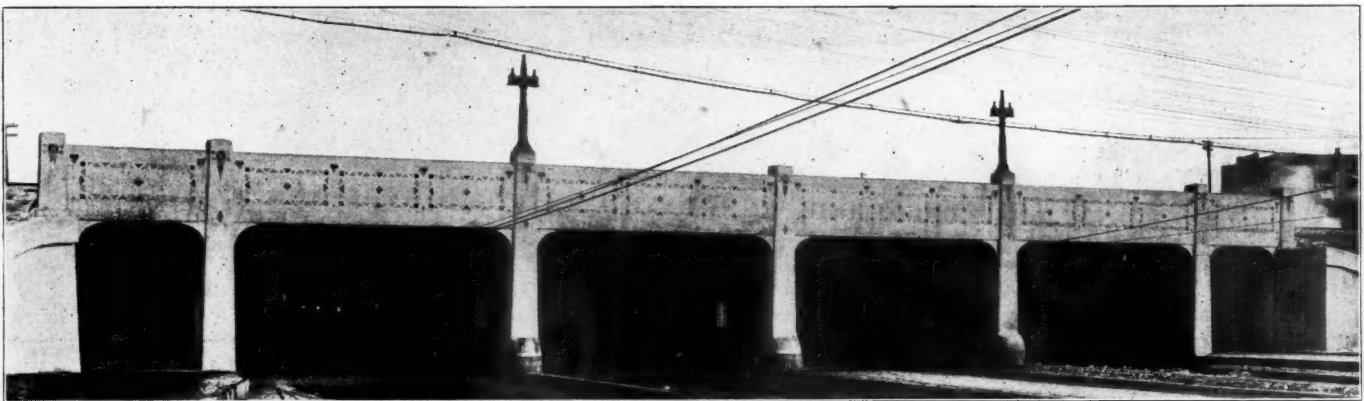
Ogden avenue, one of the boulevards in the West Park system of Chicago, is crossed near Western avenue by the Baltimore & Ohio Chicago Terminal, the Chicago & North Western and the P. C. C. & St. L. It was necessary to design a subway to carry the tracks over this boulevard the appearance of which would conform with the character of the street. The method of ornamentation adopted is new for this class of work. There are three separate structures, all having six spans with longitudinal trough floors and concrete ballasted decks. The clearance between structures is so small that only the north face of the north subway and the south face of the south subway had to be considered in plans for ornamentation. A deep fascia girder was provided on the face of the B. & O. subway and both the girder and the end columns of the transverse bents directly under the girder were encased in concrete. The columns were first cast and the wall forms erected upon them. All forms were made on the ground and hoisted into position. It was necessary on account of the depth of the girder and the curve on which the north subway is built to brace the forms on a scaffold rather than to wire them in place. The reinforcement consisted entirely of $\frac{3}{4}$ in. bars, the method of bonding to the girder being shown in the accompanying cross sections. The rivets in the flanges of the fascia girder were knocked out

verse rods. The concrete casing over the girders has a depth of 6 ft. 9 in. and a width on top of 1 ft. The outer face is vertical, the inner face being battered at an angle depending on the height of the floor and the width of the top girder flange.

The concrete was composed of one part Universal Portland cement and four parts crushed limestone running from dust to $\frac{1}{4}$ in. in size. The concrete was machine mixed and hoisted from the street to wheel platforms above the bridge floor. The mixer engine furnished power for the hoist, the cable being wound on the drum used to raise the charging elevator. This arrangement, which was made necessary by the limited room available in the street, proved very effective. Owing to the comparatively cold weather during construction an expansion joint was left between the walls and the columns calculated to allow for an increase in temperature of 60 deg.

The feature of principal interest in the design of the fascia girder is the method used to ornament the surface of the concrete. No attempt was made to panel the surface. Buttresses are provided over the columns, and the faces of the girders between columns are ornamented with a design in colored tile. Moravian tile in three colors, red, blue and yellow, was used for this work. This decorative scheme was designed by Price & McLanahan, architects, of Philadelphia, and the effectiveness of the design is clearly shown in the accompanying photograph.

Four ornamental lighting pillars of concrete are provided on each face. These standards were cast separately in plaster of

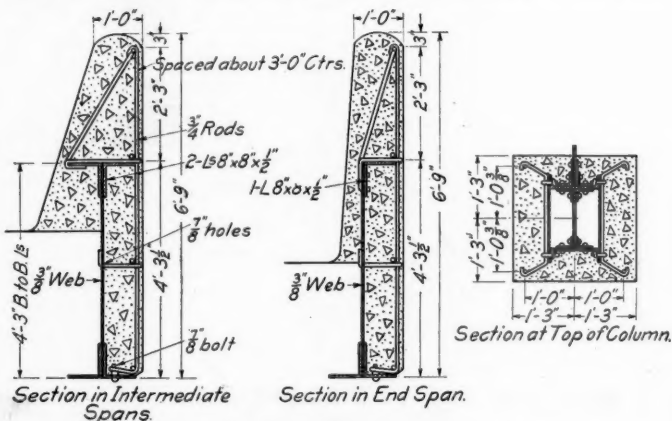


Facia Girder and Ornamental Lamp Posts; Ogden Avenue Subway, Chicago.

where it was necessary to insert the ends of the bent reinforcing rods to secure a connection to the girder. Four longitudinal rods are used, so placed that they can readily be held in position by the transverse reinforcement. In addition to the bar reinforcement a rectangular mesh was used to minimize the effect of vibration stresses. The column reinforcement consists of rods bent as shown in the column cross section which are secured to the outstanding flanges of the channels by hook bolts inserted in rivet holes. Vertical reinforcing rods are placed near each corner of the column and are held in place by the outer bents of the trans-

verse rods. The concrete casing over the girders has a depth of 6 ft. 9 in. and a width on top of 1 ft. The outer face is vertical, the inner face being battered at an angle depending on the height of the floor and the width of the top girder flange. The tile decorative scheme is carried out on the columns by two bands of tile, as shown in the photograph. The entire surface of the lamp standards and girders and columns was washed with dilute muriatic acid and scrubbed with fiber brushes. The cost of each portal complete with lamp posts was a little over \$5,000.

The work was carried out by the J. J. Croake Company, Chicago, under the supervision of G. E. McCurdy of the P. C. C. & St. L., F. E. Lanphere of the B. & O. C. T. and A. C. Schrader of the West Park Commission.



Details of Reinforcing About Girders and Column.

The negotiations regarding the construction of railways in Eastern Anatolia are progressing successfully, and it is expected that the conversations on the subject between the Turkish and Russian governments will lead to a satisfactory conclusion.

When the next parliamentary session is opened in Lisbon, Portugal, a bill will be presented, authorizing the government to take over the railways, which are now private concerns, mostly in the hands of French bankers. In order to do this a capital of \$50,000,000 is necessary, and the government will hypothecate the revenues from the railways to meet the loans which will be necessary for the carrying out of the program of nationalization. Immediately the railways bill is voted the Portuguese government intends to consult several British and French bankers with a view to obtaining the best terms on which it can raise the loan.

THE USE OF ELECTRICITY ON RAILWAYS.*

Its Future Application to Transportation, Particularly
Through the Development of Large Central Power Stations.

BY E. M. HERR,

President of the Westinghouse Electric and Manufacturing Company.

It is a rather curious fact that the steam railway, the industry which has made the greatest progress in the last 50 years, and has done the most to advance civilization, has thus far benefited least by the development of electricity.

When the really marvelous adaptation of the modern steam locomotive to the work of transportation under the extremely varying conditions of railroading met with in the world today is considered, it is quickly seen that very difficult conditions must be met by any kind of motive power ambitious to supplant it. Having received my early training in the motive power department of a railway, and spent 16 years in that and the operating department, I fully appreciate the conditions to be met and have no hesitation in saying that the field of applied electricity has as yet nothing to offer as a substitute for the steam locomotive in all its applications.

I have also no hesitation in saying that although the steam railways have thus far benefited less than almost any of our great industries by the development of electricity, it is certain that before many years they will, as a whole, be greater users of electricity and electrical appliances than any other industrial class. This being the case, I require no apology for presenting some thoughts on this subject to such a body of potential electrical users.

It was until recently the practice for each large user of electric power to install his own generating plant, which necessarily was run with a load seldom the full capacity of the engine and generator, and therefore rarely under conditions of maximum efficiency. In fact, these installations much of the time ran at one-half, one-third, or even quarter load, or less, and were nearly always shut down entirely for some portion of the 24 hours; in other words, the load factor of the station was extremely bad.

As the impossibility of a good load factor without diversity of load was better understood, the smaller stations became consolidated into larger power plants, furnishing not electricity for light alone or for power used in some special way, but for light and power used in as many ways and with as wide a spread as possible, during the 24 hours, when other power and especially the concentrated period of maximum lighting demand is absent.

This diversity of load resulting in a high-load factor is now being given great attention, and most wonderful results in improving the cost of producing electricity are obtained. The load factor influences enormously the cost of power—thus a plant having a load factor of one-quarter (a condition better than is often met with in a power house supplying power for a single purpose) has a cost per kilowatt-hour about twice as great as would be the case were the load factor from 60 to 70 per cent., a condition not at all impossible with a sufficiently diversified load.

The importance and economy of a diversified load are fast causing a concentration of electrical power plants into enormous installations of great centralized plants, so located as to distribute power over large areas at a minimum cost, resulting also in a material conservation of our coal supply, estimated by Samuel Insull at upwards of 200,000,000 tons per annum if the generation of energy for the different communities were concentrated in a few favorable localities.

I quote further from a paper recently read by Mr. Insull, who is president of the Commonwealth Edison Company, Chicago, before the American Institute of Electrical Engineers:

"The concentration of the production of energy for all purposes

required in a given area of population would result in such a saving of capital and operating expenses as to provide for the generating, equipment and primary transmission systems necessary to electrify the terminal systems and suburban service of all the trunk lines centering in and around any large center of population, and particularly Greater New York."

Mr. Insull further estimates that by operating the system in New York as a unit rather than separately, operating expenses would be reduced by \$1,000,000 per year, and taking into account fixed charges, depreciation and interest, the change would result in the creation of about \$60,000,000 in value.

How does the development of these great modern central power plants affect the railways? I have already said that electricity has as yet nothing to supplant *generally* the steam locomotive. This does not mean, however, that the electric locomotive has no place on a steam railway, or that there are no conditions under which the steam locomotive can advantageously be displaced by the electric locomotive. There are, under present conditions, a number of such, and when the steam railways furnish (as they themselves will ultimately) a great load to the modern centralized power plant which will modify and so greatly improve the load factor and costs of producing power by these great plants, they will obtain such low costs and great reliability of power that the field for the advantageous use of the electric locomotive will be enormously extended. The rapidly increasing requirements for more and more powerful locomotives, adapted to the rapid and continuous movement of heavier trains, and the demand that such locomotives, while enormously powerful, shall be easier on rails and roadbed than far less powerful and less efficient steam locomotives (a condition met by the operation of several electric locomotives by one man through the system of multiple-unit control) will still further add to the opportunity for the advantageous use of this new power in the transportation field. The railways will then buy electric power delivered on their lines instead of coal, and be saved the large capital expenditure required for the installation of power plants.

One place already occupied by the electric locomotive is in the terminals in large cities. Here, as in many other places, where the application of electricity is highly advantageous, it was not at first the economies from either the first cost or the lower operating cost that brought about the change to electric power. The electric locomotive was first used in terminal work because of the nuisance and discomfort to passengers and others of steam power, and the change was made by legal enactment and regardless of economy. Like many other enforced changes, so many benefits, not at first apparent, have developed that it is fast becoming evident that the incidental advantages are so many and so great that in the future no other means of operating a great terminal in a large center of population will, from even purely economic conditions, be considered.

Thus, in a large city it is now possible by using electric locomotives to establish a great railway terminal in the very center of population without any annoyance or discomfort to the neighboring people, and with practically no loss of the very valuable land for building purposes, without regard to the kind of buildings to be erected, excepting that the terminal shall occupy the basement, or, if desired, the sub-basement. So clean, noiseless and adaptable is an electrified terminal that the occupants of the building erected over it only know of its existence by seeing the ebb and flow of the tide of humanity going and coming by its trains. Again, the electric locomotive enables the capacity of a terminal to be greatly increased owing to the greater rapidity of

*Abstract of an address delivered at the dinner of the American Railway Guild, New York, May 14, 1912.

its movement over that of a steam locomotive, and the fact that the electric locomotive does not have to be turned, coaled, watered, have fires cleaned nor its boiler washed. This also reduces the locomotive equipment needed for a given train service.

All these advantages of the use of the electric locomotive in the terminals of large cities may be conceded, but objections may still be made that the cost is so high as to be almost, if not quite, prohibitive. Let us consider this seemingly high cost.

Why is it that electricity has almost entirely supplanted direct steam as a means of driving the machinery in shops, factories, and mills of all kinds, notwithstanding that the steam power plant can be installed for about \$40 per horsepower, while from two to four times this amount per horsepower is required to supply the corresponding electric power plant?

True it is, that notwithstanding the higher first cost there is a large saving in direct operation by electricity as compared with steam engines, but this is not the only, or indeed the chief, reason for the change. The higher first cost is more largely justified by the possibilities which electricity gives of doing other and better work, and of obtaining results not in any way possible with steam power. When the railways can buy electric power metered on their lines at such points as they desire to use it which will be furnished from large centralized power plants so arranged as to make failure of supply practically impossible and at a cost of but a fraction of the cost of power on a steam locomotive, then the use of the electric locomotive will be so widely and rapidly extended as is now not dreamed of, nor under present conditions economically possible. So on railways the advisability of electrification must stand or fall on not only the consideration of the relative economy, capital cost and operating cost both considered, but in addition to this (and often more important) a proper judgment of what economies and results can be obtained by electricity that steam cannot accomplish. Thus the increased capacity of a given terminal, together with the utilization of valuable sites for buildings made possible only by electrification, may alone amply justify the increased cost.

In addition to the advantages mentioned above, in large terminals, the use of electricity on wharves, in freight houses and in properly designed auto trucks for delivery of freight to consignees and collecting freight from shippers must not be overlooked. On wharves, in freight houses and other places where freight is temporarily stored or stopped in its movement from one kind of carrier to another, electricity by its wonderful adaptability to subdivision and use in small or large motors is most advantageous. By a system of telpherage, properly designed and adapted, all kinds of freight can readily and economically be taken from car to freight house or wharf, or the reverse, and, what is of very grave importance, the entire space covered by this system can be economically used. The statement has been made that the cost of moving a ton of freight from the point at which it originates to the railway car which is to carry it by rail to the railway terminal at its destination, added to the additional cost of delivering it from car to the consignee's store, factory, or warehouse, is as large as the entire charge for rail transportation for a large proportion of freight handled by rail which has to be delivered and collected by dray or truck. Why then should not the railways themselves arrange to collect and deliver freight, especially package freight, at terminals? Here, again, electricity can be of great service in furnishing the power to drive the telpherage for loading and unloading cars and supply the motive power of a fleet of auto trucks and drays so handled as to cause the minimum delay of freight cars at terminals and the promptest delivery of package freight at the lowest cost.

There is one feature of this valuable agent in railway service that must not be omitted, because it is really but little understood or appreciated—this is the reliability of electricity when properly handled. I am safe in saying that there is no class of machinery today that can be designed so exactly to meet given conditions as electrical machinery. Think of the reliability and freedom from failure in the electrified transportation service in and about

this great city of New York. Centering here are the electrically-operated terminals of the two greatest railway systems of the world, the train service on both of which statistics show is far less subject to interruption and delay since operated electrically than under the best results ever obtained by steam. This is creditable and reassuring, but how much more remarkable and really marvelous are the results obtained in the operation of the subway and elevated railways of this great city, both of which are operated with a headway of trains absolutely impossible of attainment with steam power, were its use otherwise possible, and with a regularity, precision and safety which is one of the wonders of this wonderful age of electricity.

It is really only about 20 years since the foresight and judgment of George Westinghouse caused him to predict and actively begin the wonderful development in the use of the alternating current, and by so doing to call down upon himself a storm of criticism from many of those then foremost in electrical development which might easily have deterred a less courageous spirit. He, through his company, persisted in the development and exploitation of this system, sure of its possibilities, and was quickly followed by all the others in the field of electrical engineering and manufacture, for it was seen to be the real foundation upon which the future development of all electrical progress was to be made. Without the alternating current the long distance transmission of power would be impracticable and the use of electricity for transportation of passengers and freight on railways impossible.

Again, in a notable address before the Institute of Mechanical Engineers of Great Britain, Mr. Westinghouse was the first to call attention to the importance of the adoption of standards and uniform methods in the development of railway electrification. The necessity for this is obvious, under the conditions of general interchange of traffic universal in American railway practice, and especially in the joint use of terminals by several lines, and the routing of passenger equipment cars through and over several connecting lines. The task of determining these standards is one of great difficulty and complexity, and can only be successfully carried out by a commission selected and employed by a sufficient number of railways who would accept the findings and conclusions of such a commission, and whom the other railways interested would acknowledge to be entirely representative. The American Railway Association would seem to be the logical place to begin this great work.

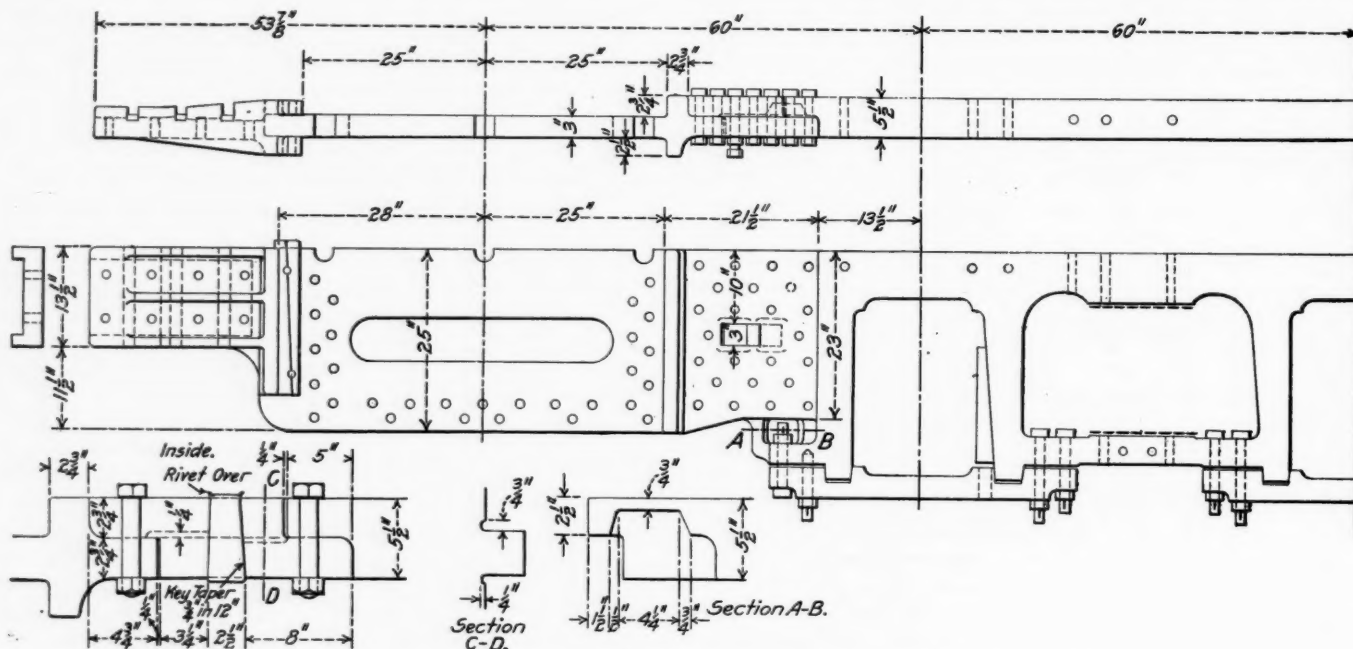
Finally, let me impress upon you that there is no longer a question of whether electricity can do the work of broadening, extending, and improving the very admirable performance of the modern steam locomotive. This has been amply demonstrated. The question to be answered in any specific case proposed is purely the economic one of will it pay. Electricity asks no consideration on any other basis, and would get none if it did. In determining this question of profit and loss let me urge that no narrow view be taken, but the real possibilities of this wonderful servant of civilized man be carefully and thoroughly weighed, and in order to do this that every railway officer determine not that he will become an electrical expert, but that he will keep in touch with the more general and commercial features of electrical development as relates to railroading, for only by so doing will it be possible for him to intelligently pass upon the many recommendations which will come before him as one of the class of the greatest users of electricity and electrical appliances in the industrial world.

The proposed route of a southern trans-Andine railway runs from San Carlos de Bariloche, Argentina, along the north shore of Lake Nahue Huapi, crosses the Andes range at Puyehue pass, continues along the shore of the Puyehue lake, and terminates at or in the vicinity of Osorno, Chile. This railway will be a continuation of the Argentine railway from port San Antonio, in the Argentina, to San Carlos de Bariloche, which is well advanced in construction.

surface is equivalent to 1½ sq. ft. of evaporative heating surface, an increase in heating surface of about 28 per cent. is indicated.

The later locomotives, while by no means the largest of their type, are very powerful machines. The boiler is of the extended wagon top type and measures 86 in. in diameter at the front end and 93 $\frac{3}{8}$ in. at the connection with the firebox. The depth of the throat from the under side of the barrel to the bottom of the mud ring is 24 $\frac{5}{8}$ in., which gives ample room for a brick arch of the Security type. The superheater has 40 elements, each double looped, and the area of 910 sq.

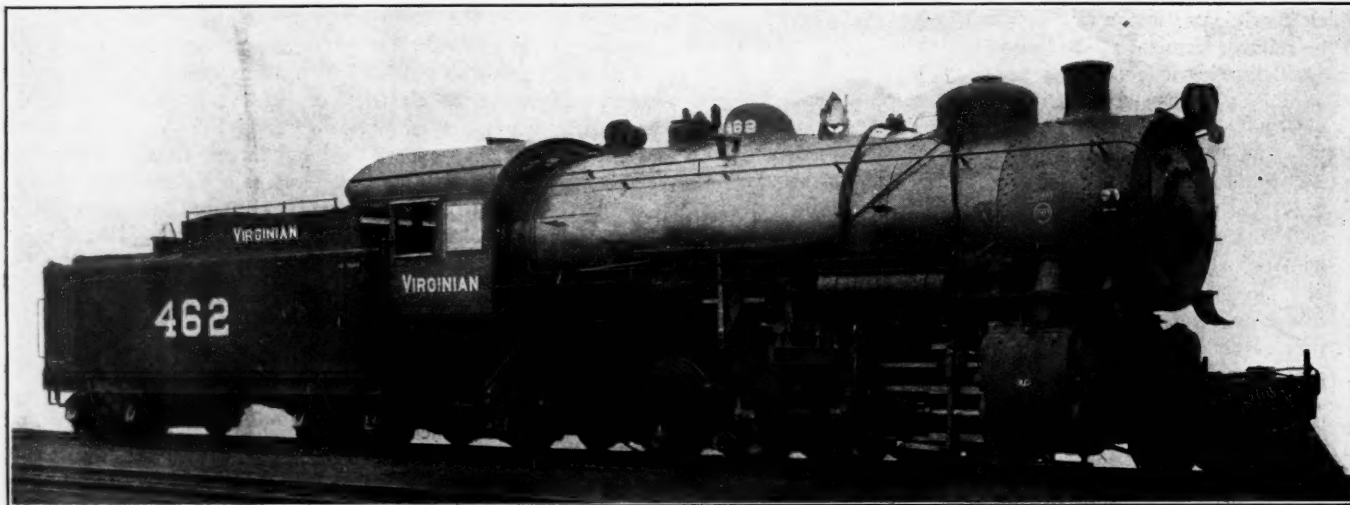
As an indication of the advance which has been made in this type of locomotive, even during the past three years, it



Front Frame and Splice with the Main Frame—Virginian 2-8-2 Type Locomotive.

ft., measured on the inside of the superheater flues, makes it one of the largest yet applied.

Among the interesting features of design is the frame splice between the front and main frames, as shown in the accompanying illustration. The cylinders are cast separate from the saddle, which allows the front frame to assume a slab form 25 in. in depth and 3 in. thick. The cylinder and saddle castings lap over the top and bottom of the frame and the flanges of both extend for a distance of $23\frac{3}{4}$ in. above the frame, giving a total height of $47\frac{3}{4}$ in. to the cylinder bolts, of which 29 pass through the frame. In addition there are three $2\frac{1}{2}$



Powerful 2-8-2 Type Locomotive for the Virginian.

in. bolts which are put in place while hot and extend across the cylinders on a line with the top of the frames. A slab splice is used between the front and main frames which are secured together with 24 horizontal bolts, each $1\frac{1}{4}$ in. in diameter. There is a slot cored in each of the frame sections and each carries a lug which fits in the slot in the other section. These are of such a size that a space is left between them for the insertion of a 3 in. x $2\frac{1}{2}$ in. tapered key. This arrangement gives the key a bearing for the full width of each frame section and securely locks the two parts together.

Inside admission piston valves, 14 in. in diameter, are employed. The valve body consists of a piece of 10 in. boiler tube, and the ends, cast from vanadium iron, are shrunk over the body. The valves are set with a maximum travel of 6 in., steam lap of 1 in. and a lead of $\frac{1}{4}$ in. Although Sheedy type circulating valves are applied, provision is made for admitting live steam through a $\frac{3}{4}$ -in. pipe to each steam chest. This is to be used when drifting.

Vanadium is quite freely used in connection with the various parts subject to the greatest stress. The cylinders are cast from vanadium iron, the frames are of vanadium cast steel and the main driving axles, main crank pins, tires, cross-head bodies and springs are also made of vanadium steel.

Tenders having a tank capacity of 12,000 gal., and a coal space sufficient for 15 tons are used. The center sills are 15 in. channels, and 10 in. channels are used for side sills. The four-wheel trucks are of the equalized pedestal type with 6 in. x 11 in. journals. These tenders are very light when their large size is considered and have a total weight, loaded, of less than 17 lbs. per gal. of water capacity.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.

The summer meeting of the Association of Transportation and Car Accounting Officers was held at the Hotel Champlain, Bluff Point, N. Y., June 25 and 26, with 115 members in attendance, and President G. W. Taylor in the chair. On Tuesday morning E. W. McKenna, vice-president of the Chicago, Milwaukee & St. Paul, gave an address on efficiency in regulating the use of freight cars. Readjustment of methods is necessary in order to obtain all possible economy. Delays incident to the use of cars for storage purposes must be eliminated. Mr. McKenna illustrated his argument by describing the methods pursued in the handling of ore by boat on the Great Lakes, where the vehicle of transportation is in use for transportation purposes 80 per cent. of the time, with but 20 per cent. dead time necessary for dockage at both ends; the prevailing average in the use of freight cars as vehicles of transportation is only about two hours out of each 24. The shipping public should be educated to a realization of its responsibilities for co-operation.

The report of the executive committee shows that the membership of the association represents 250,952 miles of railway having in service 2,481,619 cars. Various changes in the constitution and by-laws, presented by the committee at its last meeting, were adopted at this meeting by the requisite vote. The changes provide for the election of the committees on conducting freight and passenger transportation as standing committees. The association concurred in the report of the president, as chairman of the special committee of fifteen, appointed at the request of the American Railway Association to prepare a draft of a method and accompanying rules to govern the handling of freight cars, which report was submitted to the committee on relations between railways of the American Railway Association, and which has been adopted by the A. R. A., to become effective September 1, next.

It was decided to hold the next meeting of the association at New Orleans, December 10 and 11.

The association concurred in the opinion of the committee

on car service that a uniform embargo notice is impracticable. The recommendation of the committee with regard to a proposed revision of Rule 10, of the code of car service rules, was adopted for submission to the A. R. A., as follows:

When a freight car is detained by reason of a railroad error, which prevents proper tender or delivery, prompt notice must be given and action taken by the holding road to secure the release of car, and the erring road will pay to the holding road an amount equal to the established per diem rate for the time such car is held. Claims under this rule to be made on the erring road within twelve months from the date succeeding that in which car is received.

This rule applies only to cars of railroad ownership, including owner's cars on owner's tracks, but it does not apply to cars bunched in transit, nor cars detained on account of weather interference.

The proposed code of rules to govern the settlement for use of freight cars on non-per diem roads, presented by the committee, was returned to it for further consideration.

The committee on office methods and accounting reported that 260 private car owners have adopted the reporting marks assigned by the committee and are applying the same to their cars. The assignment of these marks by the committee is under authority of the American Railway Association. The association adopted, for submission to the American Railway Association, the proposed amendment to Rule 1 of the code of per diem rules, which provides that where per diem is not reported to the car owner within six months from the last day of the month in which it is earned, the rate shall be increased 20 cents per car per day. The proposed change in the standard form of interchange report presented by the committee, permitting the use in connection therewith of narrow sheets or flaps for self-transcribing purposes, was adopted for submission to the American Railway Association. It was voted that the committee should indicate on the proposed form the precise measurements of the horizontal lines. In connection with the question of the expediency of closing interchange reports at noon instead of at midnight, the association concurred in the opinion of the committee that the date of each interchange report should conform to the actual calendar date on which cars are interchanged.

In connection with the report of the committee on conducting freight transportation, the association adopted, for submission to the American Railway Association, a proposed change in Rule 11 of the code of car service rules, providing that all cars of railway ownership should be re-weighed and re-stencilled at least once every two years. If the proposed change is favorably acted upon by the A. R. A., a corresponding change will be necessary in Master Car Builders' Association Rule 30. A report of progress was presented in connection with the subject of transportation rules for the handling of perishable freight. The information gathered by the committee of this association has been made available to the American Railway Perishable Freight Association.

The committee on conducting passenger transportation submitted a proposed code of car service rules, and a proposed form of interchange report. At the request of the committee, it was decided to submit the proposed rules and form of report to each railway member of the association, owning passenger equipment cars used in joint or interchange service.

The committee on joint interchange and inspection bureaus gave some interesting data concerning the status of the subject at various large centers. The officers elected for the ensuing year are: President, J. M. Daly (Illinois Central); first vice-president, F. Price (Grand Trunk); second vice-president, E. F. Kearney (Missouri Pacific); secretary, G. P. Conard, New York; treasurer, F. M. Luce, Chicago.

The association requested the committee on car service to prepare a special report, for general distribution, giving an outline of recommended practice under which Rules 1 to 4, code of car service rules, and Rule 19, code of per diem rules, governing the handling of freight cars, as recently adopted by the American Railway Association to become effective September 1, may be efficiently applied.

MANUAL BLOCK SYSTEM ON SINGLE TRACK.*

The Chicago, Milwaukee & St. Paul was one of the earliest roads to use the space-interval system on lines where the traffic was light or fluctuating, and specimen records of the practice on that line are given below.

The line from Rondout, Ill., to Janesville, 66.7 miles long, is one on which there are three passenger trains through, each way, on each week day, two additional each way for 41 miles, and nine additional each way for 3 miles, with about the same number of freight trains. On an average day recently all of the trains in both directions were given clear signals at every block station except one east-bound freight train. The total number of trains on that day was as follows (see list of stations below): For the first 3 miles from Rondout, 9 passenger each way, 8 freight west bound and 7 east bound; from Libertyville to Fox Lake, 5 passenger each way and 5 freight each way; Fox Lake to Walworth, 5 passenger each way and 4 freight each way; Walworth to Janesville, 3 passenger each way and 5 freight each way, with the exception of 15 miles, where the number of freights was 1 less. The freight referred to above, which had to be run by permissive signals, was the second section of a live-stock train running eastward in the middle of the night, when the block sections were long (16 miles, 12 miles, 22 miles, 8 miles).

The block stations on this line are as shown in the list below, the only ones kept open day and night being those marked "N." On this line and on the other line of the same road hereinafter noticed the facilities at the stations are substantially the same as on the Chesapeake & Ohio and the Baltimore & Ohio heretofore noticed; that is to say, the only important expense above that which would be incurred in running the road without the block system is the addition to the pay roll for additional telegraphers.

CHICAGO, MILWAUKEE & ST. PAUL—JANESVILLE LINE.

Stations.	Distance from last preceding station.
	Miles.
Rondout	N 0
Libertyville	3.2
Soo Tower	N 4.4
Grays Lake	1.1
Round Lake	3.0
Ingleside	3.8
Fox Lake	1.8
Spring Grove	4.2
Solon Mills	2.1
Hebron Tower	N 6.0
Zenda	5.6
Walworth	1/2 N 6.1
Bardwell	N 8.6
Avalon	6.7
Rock River	N 8.1
Janesville	N 2.0

The Chicago & Council Bluffs division of this road, from Marion westward to Perry, Iowa, 137 miles, is a section of an important main line, all single track. (See list of stations below.) On November 18 last the total number of trains on this division was 15 westbound and 17 eastbound, as follows: Four passenger trains through west and five through east; seven freight through each way; three short runs west bound and four east bound.

The passenger trains received clear signals throughout, except as follows: No. 37 permissive at Atkins, Newhall and Van Horn; No. 4 at Bouton and Phildia.

Of the westbound freights two through trains received clear signals all the way. Two of the short runs clear all the way; one for 31 miles and the other for 17 miles. The first freight on the sheet received clear signals, except at five places: Newhall, Cambridge, Phildia, Woodward, and Bouton. The next freight received clear signals all the way, except at Melbourne and the next two stations. The next

freight received clear signals, except at eight stations, namely: Van Horn, Melbourne, and the next three; Cambridge and the next two. The next train, running over only 43 miles, received permissive signals at Atkins and Newhall. The next freight received 10 permissive signals as follows: Keystone and the next three; Melbourne and Rhodes; Cambridge and the next two; Phildia. The next through freight received clear signals except at Keystone, Elberon, Gladstone, and Tama (Vining, Potter, and Dunbar being closed); at Ferguson, Haverhill being closed. The closing of Potter and Dunbar made one block 12½ miles long.

Eastbound freights received permissive signals as follows: A short run of 17 miles permissive at Bouton; a through freight clear at all stations, except Madrid, Slater, and Huxley. The next train received clear signals at all stations. The next received clear signals, except at Huxley, Rhodes, Keystone, and Van Horn. The next, a through train, received clear signals at all stations, except Madrid, Elberon, Atkins to Louisa, and Louisa to West Marion. The next train received clear signals at all stations, except Phildia. Next came two short runs (55 miles and 43 miles) clear signals all the way. The next train, a through freight, received clear signals at all stations until it reached Tama; thence permissive for the rest of the trip, the block sections being long (21.5 miles, 12 miles, 11 miles, 10 miles). The next train, running for 74 miles, received clear signals all the way, and the next and last was a through train receiving clear signals all the way.

CHICAGO, MILWAUKEE & ST. PAUL RY.—CHICAGO & COUNCIL BLUFFS DIVISION.

Block stations.	Distance from preceding station.	Office open daily.	Block stations.	Distance from preceding station.	Office open daily.
	Miles.	Hours.		Miles.	Hours.
West Marion	0	24	Haverhill	4.9	12
Louisa	4.2	12	Capron	4.7	24
Covington	5.5	18	Melbourne	2.6	12
Atkins	5.4	12	Rhodes	4.8	24
Newhall	5.4	24	Collins	6.8	12
Van Horn	6.4	12	Maxwell	5.0	18
Keystone	5.6	24	Elwell	3.5	12
Elberon	6.1	12	Cambridge	3.6	24
Vining	4.0	18	Huxley	4.1	12
Gladstone	6.7	12	Slater	4.1	24
Tama	4.7	24	Madrid	6.8	24
Potter	5.6	12	Phildia	3.0	12
Dunbar	5.1	12	Woodward	4.7	24
Pickering	1.8	18	Bouton	4.5	12
Ferguson	2.6	24	Perry	4.6	24

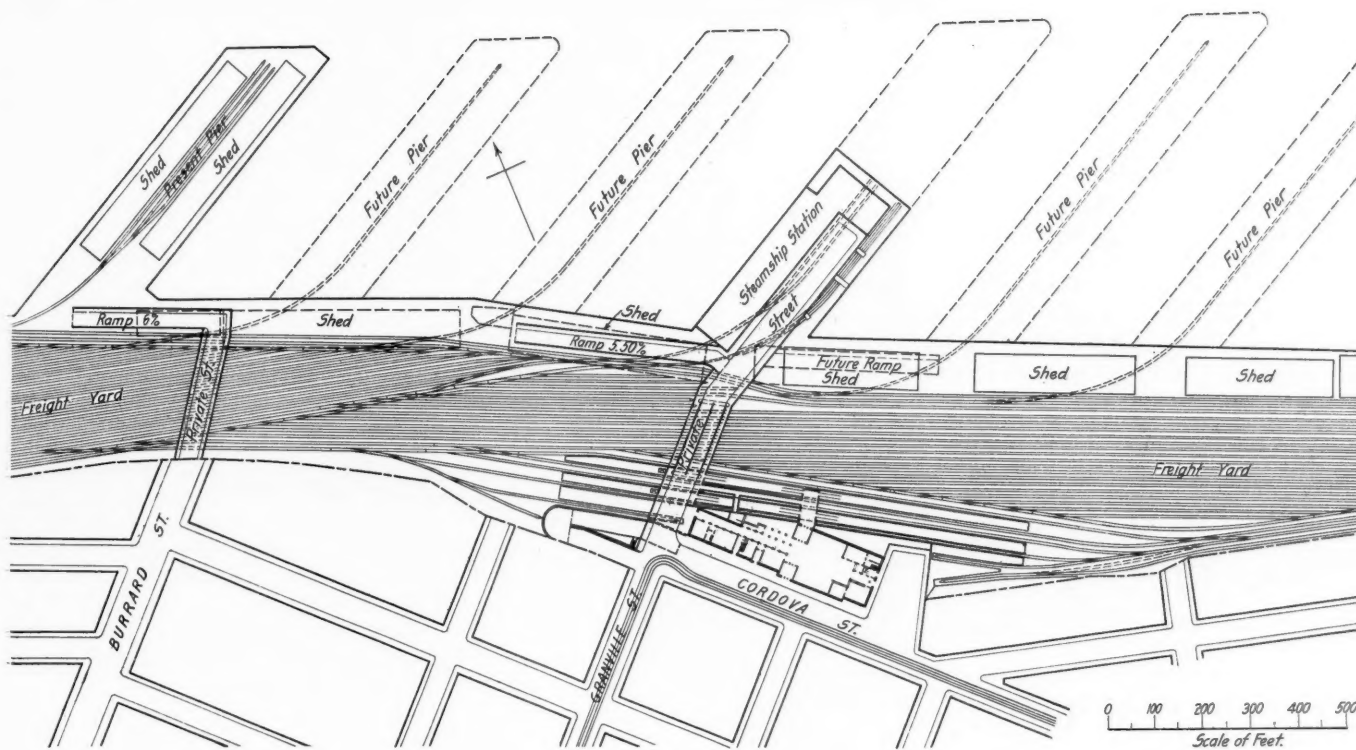
CANADIAN PACIFIC PASSENGER TERMINAL AT VANCOUVER.

Work is now under way on certain improvements in connection with the Canadian Pacific's passenger terminal at Vancouver, B. C. The present passenger station is at the foot of Granville street, near the shore line of Burrard inlet. The station was built about fourteen years ago, and, except for minor alterations, is unchanged from its original plan. The general waiting room and ticket offices are at the street level, and the baggage room is on the track level, which is about 30 ft. below the street.

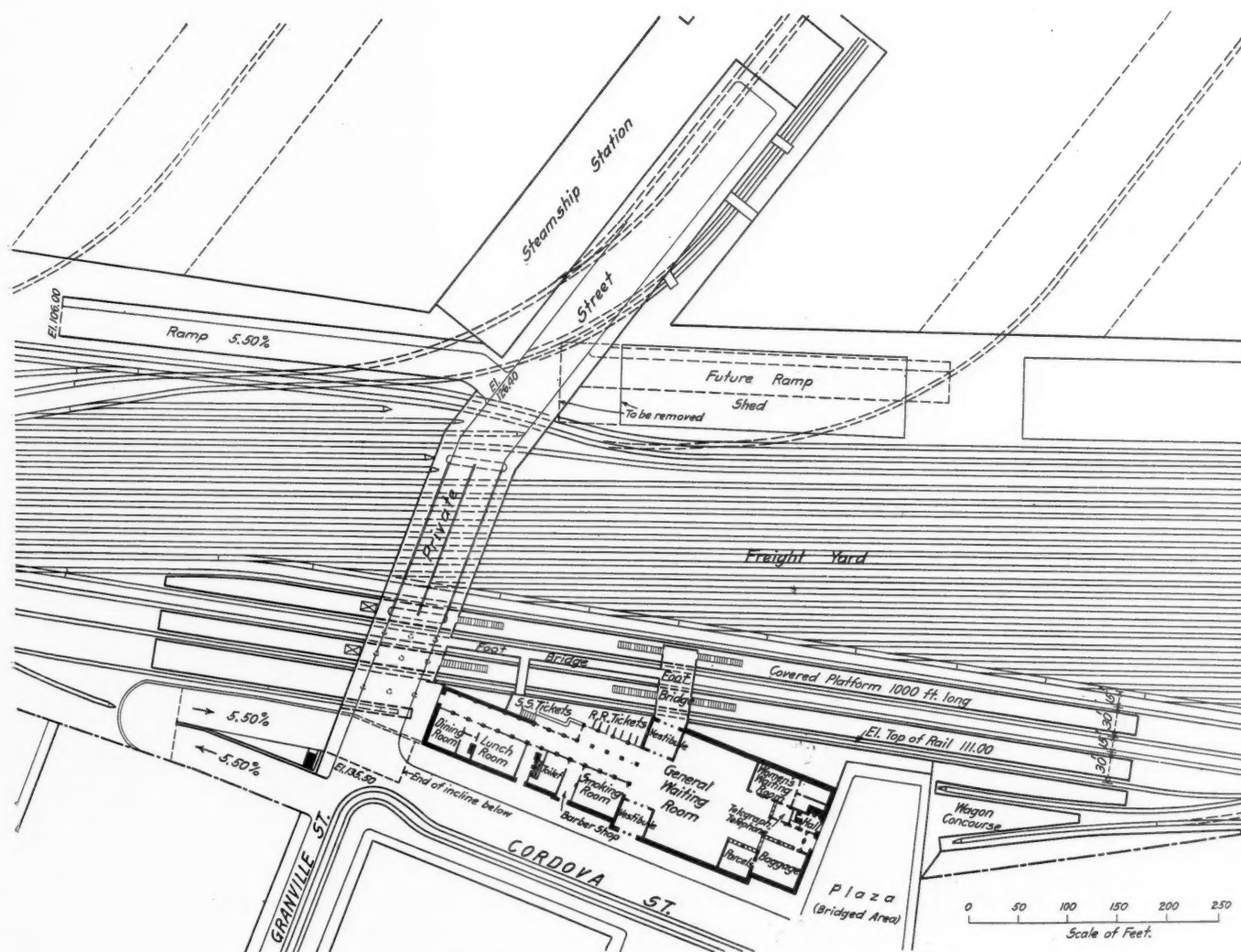
Along the water front, across the local freight yard tracks, are the steamship wharves. There are two large sheds on a jetty pier of recent construction used by the Trans-Pacific steamship lines; also five sheds adjoining the longitudinal wharves used by the Seattle, Victoria, Alaska, and other steamship lines of the Canadian Pacific. Between the wharf sheds and the passenger tracks adjoining the passenger station certain of the freight tracks serve the several sheds, and other tracks are used for switching and storage. The yard tracks extend along the harbor front about one and a half miles.

The growth of Vancouver has rendered inadequate the present facilities for handling the terminal business of the railway company, and the general plan shown herewith has been adopted

*From the annual report of the Block Signal and Train Control Board of the Interstate Commission.



General Layout of Passenger Station, Freight Yards and Piers.



New Canadian Pacific Passenger Station at Vancouver.

to relieve the present congestion, as well as to provide for reasonable growth in the near future.

The general scheme embraces a passenger station and office building suitably located on available land immediately east of the present passenger station. There will be four passenger tracks, with provision for more when required, separated by wide platforms, between the station and the present freight yard. The passenger tracks are to be raised about 5 ft. above the present track level, to reduce the difference in level between the street and the tracks to about 25 ft.

To avoid an inconvenient grade crossing and delays to traffic between the city and steamship wharf, a bridge on the line of Granville street, extended, is to pass over the passenger and freight tracks to the steamship pier and connect directly with passenger accommodations on the pier. An incline is also to be built leading from the west side of this bridge to the wharf giving access to the lower deck of the pier and freight sheds, and the water front. Another viaduct over the tracks is to be built on the line of Burrard street, extended northerly, with an incline giving access to the present Trans-Pacific pier and other portions of the water front.

The main entrance of the passenger station will be on Cordova street, with the main waiting room located centrally in the station on the street level. Ticket offices serving the several classes of railway and steamship passengers are at one end of the waiting room, and the baggage checking room, lunch and dining room, parcel room, women's waiting room, men's smoking room, news booth, information booth, and other facilities are all placed immediately adjoining the main waiting room.

On the lower floors of the station are the baggage rooms, express companies' space, immigrant rooms, supply rooms, and other station facilities not directly used by passengers. Stairways and elevators connect the two levels of the station and afford communication with the office floors above. A separate foot bridge is carried over the passenger tracks, directly connected with the waiting room at one end and with stairways leading to the track level, giving access to platforms without crossing tracks at grade. The track platforms are 1,000 ft. long and are to be covered with shelter sheds of the umbrella type. The platform adjoining the station will be used only for baggage, express and supplies.

Above the public rooms of the station building the space will be devoted to the general offices of the railway company. The interior arrangement of the office space will be adapted for a unit system of subdivision; that is, each panel will have heating and lighting facilities so that partitions may be placed or removed at will in order to provide for changes in arrangement of office accommodations which may be desired from time to time.

The proposed steamship station on the pier is a two-level building, the upper floor being devoted to the passenger business and offices, and the lower floor to freight, baggage and express. There will be double level gangways on the west side of the pier, which will be used for the Victoria and Seattle service, the lower gangway being used for freight, and the upper for passengers; these gangways to be supported on floating pontoons to maintain the landing at a constant level with respect to the boats.

On the passenger, or upper, level of the pier are waiting rooms, ticket offices, baggage checking room, customs office, and other conveniences. Separate rooms are provided for outgoing and incoming passengers. Two tracks will be placed on the surface of the pier within the shed and one track on the outside of the building for the direct handling of freight between cars and steamers.

The whole design has been to secure easy lines of communication between the railway trains, the steamships and the city. The traffic conditions at Vancouver are unusual as compared with other large terminals on account of the absence of suburban business. The aggregate number of trains is not large, but

they are long and frequently are run in several sections and contain a number of classes of traffic.

The designs for the terminal have been prepared by Westinghouse, Church, Kerr & Company, in co-operation with the officials of the Canadian Pacific, and the construction of the station and facilities is now being carried out by the same organization.

EMPLOYEES' RESPONSIBILITY FOR THEIR OWN SAFETY.*

No law, no matter how rigidly enforced, can correct evils that are directly chargeable to failure of employees themselves to do their duty and to exercise due precaution not alone for their own safety, but also for the safety of others. We know that employees often fail to exercise ordinary precaution in the performance of their work. This failure is often a form of thoughtlessness in which the chief motive is haste, and generally it is true that some ease or saving of time to themselves is secured by almost every unnecessary risk they take. . . . I want to bring to your attention the number of derailments reported as due to the negligence of trainmen, switchmen, signalmen, etc. It can be assumed without question that these are preventable accidents.

I find that 1,976 of the derailments, or 6.26 per cent. of the whole number that occurred during the five year period, ending June 30, 1910, were caused by the negligence of trainmen, switchmen, signalmen, etc. In these 1,976 derailments, 263 persons were killed and 2,264 persons were injured. There was a property loss of \$1,413,342; this indicates a yearly average for the period of 395 derailments, causing 52 deaths and 453 injuries due to the negligence of employees. Such accidents as these are clearly preventable. Employees can and should entirely eliminate them.

The employee who leaves a switch open or who fails to flag properly, thereby causing a disastrous accident, is always known, but in minor cases of carelessness you may not be able to trace the particular accident to the man who neglected his work or who failed to perform the proper service, or who discovered a defect and failed to make the necessary repairs. The man who discovered a loose ladder tread or loose handhold, and failed to report or repair it may never know that he was responsible for the death or serious injury of a fellow employee, possibly a thousand miles distant.

Inspectors of the commission have found much bad practice. Derails have been found outside of the fouling point on side-tracks. Signals have been found connected by wire in such a way that the breaking of a wire would allow the signal to go to the clear position. Detector bars have been found disconnected and bolt locks to the switches filed until they were useless. On one road it was found that the signals at a drawbridge were so arranged that it was possible to give a clear signal to permit a train to cross the bridge wide open.

The use of safety appliances on cars is an important factor in the prevention of accident. The commission's records show that of the total deaths and injuries suffered by trainmen in 1893, 44.33 per cent. were due to coupling and uncoupling cars. This percentage has steadily decreased from year to year until in 1911 it was but 6.3 per cent.

A thoughtful and active mind is the first necessity for safety, but in the hazardous occupation of train operation it seems that attention to safety has been secondary and occasional instead of continuous and of prime importance. If we can instill the idea that it is more honorable and more professional to be cautious and prudent than to take unnecessary risks a great reduction in the accident records will result.

*From an address by H. W. Belnap, Chief Inspector of Safety Appliances, Interstate Commerce Commission, before a meeting of Baltimore & Ohio employees at Philadelphia.

General News Section.

The Texas & Pacific has just adopted the American Railway Association's standard code of train rules.

The annual field day of the Traffic Club of Chicago was held at the Midlothian Country Club on Friday, June 28.

The Edison medal for achievements in electrical science for the year 1911 has been awarded by the American Institute of Electrical Engineers to George Westinghouse.

A large "safety meeting" of officers and employees of the New York Central Lines was held in Indianapolis, Ind., June 26. The principal speaker was G. M. Bradshaw, general safety agent of the New York Central Lines.

The annual summer outing of the Traffic Club of St. Louis was held at the Sunset Inn on Saturday, June 29. A special train to carry the members to the Inn was furnished by W. B. Biddle, vice-president of the Frisco Lines.

No passengers were killed in train accidents on the Chicago, Burlington & Quincy during the fiscal year 1911, during which time 22,014,305 passengers were carried. No passengers have been killed on the Chicago suburban lines during the past five years.

The Missouri, Kansas & Texas of Texas was fined \$14,500 in the United States district court at Austin on June 27, for 29 violations of the order of the state railway commission, requiring that an extra train be run whenever a regular passenger train is 30 minutes late.

Officers of the shop craft unions employed on the railways west of Chicago that have recently organized the Federation of Federations and have taken a strike vote, have addressed a letter to W. A. Garrett, chairman of the Chicago General Managers' Association, asking for a conference.

One of the repair shops of the Erie, at Dunmore, Pa., was wrecked by the sinking of a coal mine beneath it on the night of June 25. The damage to the building and contents is estimated at \$16,500. The building was of concrete, 60 ft. x 80 ft. No person was in the building when the settling occurred.

The committee representing the firemen's brotherhood presenting demands for increased wages and improved working conditions on railways in Eastern territory, has agreed to postpone further conferences with the general managers' committee until after arbitration of the enginemen's demands has been concluded.

The Chicago Transportation Association, which now has 1,200 members, formally opened its new club rooms in the old Hamilton Club building, corner Clark and Monroe streets, Chicago, on June 27. The building, after it has been remodeled, will be called the "C. T. A." building. A special program was given in the evening.

At the annual convention of the Association of American Railway Accounting Officers held last week at Quebec, M. P. Blauvelt, comptroller of the Illinois Central at Chicago, was elected president, and C. M. Bunting, comptroller of the Pennsylvania Railroad, Philadelphia, and C. B. Seger, deputy-comptroller of the Union Pacific and Southern Pacific, were elected vice-presidents.

The Colorado State Railway Commission has begun suit in court against the Colorado & Southern to compel the railway company to resume the operation of its line from Breckenridge to Como, 23 miles. The company declares that the operation of the line would be an unreasonable burden on its treasury. The highest town between Breckenridge and Como is 11,250 ft. above the sea.

The Chicago, Burlington & Quincy is making a valuation of its physical property. The company has recently made a valuation in Nebraska, on the order of the railway commission, and it has been decided to extend the work to the entire system. Disinterested persons will be asked to determine the values. For instance, in an Iowa city the mayor, a real estate man and two or three other business men were asked to constitute a board of appraisers.

The second semi-annual general meeting of the Chicago Great Western Station Agents' Association will be held in Chicago

on July 24, at the Stratford hotel. After a business meeting and a session devoted to the reading of prepared papers, the party will be taken on a tour of inspection of the Chicago freight terminals, particularly those of the Great Western and the Illinois Tunnel system. At the annual meeting on June 24, J. H. Howard was elected president; Oscar Townsend, vice-president, and J. H. Ambruster, secretary.

The Brooklyn Rapid Transit Company, in a circular issued to employees specifically mentioning their faithful work has announced an increase averaging about 5 per cent. in the pay of all the employees in the transportation department of the surface street railways operated by the company. About 5,000 men will receive this increase. The pay of conductors and motormen will vary, according to length and efficiency of service, from 23 cents an hour to 26 cents.

The New York, Westchester & Boston, which was opened from its southern terminus in New York City northward to New Rochelle on May 29, was opened on July 1 to White Plains. The White Plains line diverges from the New Rochelle line at Columbus avenue junction, Mount Vernon. There are 56 passenger trains each way daily between New York (180th street) and White Plains, and about the same number between New York and New Rochelle, so that from New York to the junction the trains run at intervals of about ten minutes from 6 a. m. until midnight.

The extensive plans for new subways in New York City, which have been a constant subject of discussion for the past two years, are now so near completion and so free from legal and other obstacles that, according to Chairman Willcox, of the State Public Service Commission, contracts will be ready to sign within a month or two, and work can be begun on any or all of the sections of the lines in about three months. The last obstacle was removed by a decision of the court of appeals last week sustaining the state and city authorities in the contracts which they have made with the companies which are to operate the lines and which contracts were challenged in the court because of the alleged granting of undue preferences to the operating companies in interest payments.

Reports compiled by the Committee on Smoke Abatement and Electrification of the Chicago Association of Commerce show that the section of Chicago's railway trackage which handles the heaviest tonnage of outbound and inbound freight is the portion of the Chicago & Western Indiana between Forty-seventh and Forty-ninth streets. During one week in January 425,000 tons of road freight were moved over this stretch of track. Records of all freight movements in the city are being prepared for one week in January, March and May, and will be made up for a similar period in August and October. For the purpose of preparing these reports the freight lines of the Chicago terminal district has been divided into over 400 sections, the dividing points between the sections being junction points. During the week in January 31,208,654 ton-miles of freight were moved in the entire district, and the number of locomotive hours for the week was 4,526.

Complaints of conductors, brakemen and firemen of the Pennsylvania, which have been the subject of negotiations between General Manager Long and committees of the employees at Philadelphia for many weeks, appear to have been finally settled. The two questions concerning which there were the most serious differences were those concerning freight trainmen on the Monongahela division and passenger men affected by the introduction of electric trains to Church street, New York City. The Monongahela division question—whether the men shall be paid yard rates or road rates—has been referred to arbitration, the railway company selecting four arbitrators, the employees four, and the men so selected to choose a ninth. At New York eight crews were assigned to other duties when the electric train service was established, the contract with the Hudson & Manhattan having stipulated that a part of the crews in the joint service should be furnished by the H. & M. The Pennsylvania has now agreed that the eight crews shall have their grievance attended to twelve months hence, at which time the contract with the H. & M. can be modified.

Chicago Freight Handlers' Strike Settled.

The strike of the Chicago freight handlers, which was declared on May 4, was called off by a vote of the International Brotherhood of Railway Freight Handlers on June 27, after President E. U. Kimbark, of the Chicago Association of Commerce, had interceded with the railways in behalf of the strikers and obtained an agreement to take at least 1,800 of them back into service by July 31, unconditionally and as individuals. The men at first rejected the offer, but accepted after they were told that the number that would be taken back would be steadily reduced the longer they stayed out. The number who struck was 5,865, but the roads had filled most of their places and declined to dismiss the new men. The strikers on the North Western, the Baltimore & Ohio and the Illinois Central lost their pension rights.

The strike has been accompanied by little violence, although there has been some confusion in the handling of freight. The result is a complete victory for the railways. A system of compensation based on tonnage handled will be established at all the freight houses in the city. It is already in effect at some stations. The original demands of the men were for an increase of \$5 a month, or one cent an hour, half-holiday on Saturdays with pay, a nine-hour instead of a ten-hour day for freight handlers, an eight-hour instead of a nine-hour day for clerks, time and a half for overtime, and double time on Sundays. These demands were later modified, but the roads rejected both propositions.

Double Track, Detroit to Toledo.

The lines of the Lake Shore & Michigan Southern and the Michigan Central (both controlled by the New York Central) between Toledo, Ohio, and Detroit, Mich., about 60 miles, both single track nearly all the way, are to be operated together as a double track railway. From the Lake Shore station at Toledo to Wagon Works Junction the line, which is owned by the Lake Shore, is double track, and over this the trains of the Michigan Central run to and from the station. From Wagon Works north the Lake Shore and the Michigan Central run approximately parallel with each other for about 51 miles to West Detroit. They are separated most of the way by only a few hundred feet, but at a few points are as much as half a mile apart. It is intended to operate this section as a double-track railway, and preparatory thereto two light bridges are being made suitable for the heaviest engine, and a number of track changes and additions have been made. Between Vinewood avenue, Detroit, and Beaubien street, about three miles, the Lake Shore parallels the Bay City division of the Michigan Central, and these two roads are now operated as one double-track railway. The Michigan Central Bay City division was already double tracked and one of the three main tracks will now be used as a sidetrack.

New Construction in Mexico.

The National Railways of Mexico has announced that it will build a total of 1,122 miles of new lines in Mexico. It is stated that there will be no cessation in the work until all of these lines are finished, which will probably be within the next three years. The new lines will open up and develop a large virgin territory, as well as provide transportation outlets for sections at present without these facilities. The construction work in progress and planned is as follows:

Branch line from Allende, Coahuila, on the Mexican International division to Las Vacas, on the Rio Grande just opposite Del Rio, Tex., 74 miles. The contract for the grading and masonry on the first 50 miles from Allende to San Carlos has been let, and construction work was started in May.

A new line is to be built to connect Tampico with the city of Vera Cruz, about 310 miles. The contract has been let for the construction of about 100 miles of grading and masonry from the Tampico end, and the work was started in May. This line will cross the Panuco river at Tamos on a steel bridge at a point six miles west of Tampico. A branch will be built from a junction with this line to a connection with the Honey branch of the old Mexican Central on the tableland, to be about 75 miles long. On the main and branch 75 lb. rail will be laid.

A line is to be built between Tampico and Matamoros, just across the Rio Grande from Brownsville, Tex., about 264 miles. This line will be built from the Tampico-Monterey branch at a point about 15 miles north of Tampico.

A 25-mile branch of the Vera Cruz & Isthmus division from Brisbin, with branches to San Cristobal, 3 miles, and Cerro Colorado, 4 miles, was finished on June 1 and is now in operation. Work is under way on a branch from Rives on the Vera Cruz & Isthmus division, 151 miles south of Vera Cruz, to San Andres Tuxtla, Vera Cruz, 45 miles; grading and masonry are completed on 35 miles, except on three river bridges. The balance of the road is about 85 per cent. finished. Track on about 30 miles has been laid with 56 lb. rail. This line will be finished by November 1.

From Penjamo, on the Guadalajara branch of the old Mexican Central, a line is being built 31 miles west of Irapuato to Ajuana on the Morelia division, 84 miles, with a branch to Cantabira, 3 miles. On the main line the grading and masonry is finished on 55 miles on the Penjamo end and on the branch. The balance of the work is about two-thirds finished. Seventy-five-pound rail is being laid. The line will be finished by November 1.

Grading and masonry work is finished and track has been laid on 34 miles of the line from Durango to Llano Grande, Durango, 63 miles. Seventy-five-pound rail is being laid. The line will be finished by October 1.

A 166-mile line is being built from Durango to Canitas on the old Mexican Central in the state of Zacatecas, 67 miles north of the city of Zacatecas, with a branch to Sombrerete, 6 miles. Grading has been finished on the first 97 miles east from Durango and 64 miles of track has been laid. The contract has been let for the grading and masonry work on the other 69 miles of main line from Canitas west, and for the 6 miles of the Sombrerete branch. Work on this latter contract began in May. Seventy-five-pound rail is being used.

One of the most difficult pieces of construction work involved in the plans as adopted will be on the branch mentioned above from a point on the Tampico-Vera Cruz line to a connection with the Honey division. This line will have to mount from sea level to the altitude of the central plateau, between 5,000 and 6,000 ft. It is stated, however, that an easy grade will be maintained in climbing this height.

American Railway Tool Foremen's Association.

The annual convention of this association is to be held in Chicago at the Sherman hotel, July 9, 10 and 11. The program includes the following topics for discussion and committee reports: Standardization of Steel for Small Tools; Henry Otto, chairman, W. J. Eddy, A. M. Roberts, C. A. Cook, J. Martin and A. Sterner. Milling Cutters, their Formation, Tempering, Etc.; A. R. Davis, chairman, Gus G. Stoettner, W. A. Fairbairn, J. A. Shaw, F. W. Luggers and A. W. Meitz. Care of Shop Tools; J. W. Pike, chairman, H. I. Derby, O. H. Dallman, Thomas Grant, E. R. Purchase and G. L. Linck. Checking System; J. T. Fuhrman, chairman, J. B. Hasty, William Greilich, H. E. Blackburn, Gilbert Mitchell and F. Peterson. Treating Steel in Electric Furnaces; G. W. Jack, chairman, B. Hendrickson, J. C. Breckenfeld and C. A. Shaffer.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May, 1913, St. Louis, Mo.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, September 12, Seattle, Wash.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—W. C. Cooder, Carew building, Cincinnati, Ohio; 3d Friday of March and September.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.
- AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; annual, November 20, 1912, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 1011 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn. Convention, July 9, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, October 21-25, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Meeting Dec. 10-11, 1912, New Orleans, La.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 20, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Convention, May, 1913, Chicago.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Convention, September 10-13, Denver, Col.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York; annual, November 20, 1912, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo. Next meeting, Nov. 17, 1912, Cincinnati, Ohio.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Convention, Oct. 8-11, Quebec.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. September 10-13, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Niquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, Oct. 17, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, Aug. 27-30, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The San Antonio chamber of commerce has decided to organize a freight traffic bureau.

The extension of the Western Maryland northwesterly from Cumberland, Md., 89 miles, to Connellsville, Pa., where a connection will be made with the Pittsburgh & Lake Erie, is to be opened for business on August 1.

Traffic has been resumed on the tracks of the Southern Pacific to and from New Orleans, following a long interruption by the recent floods. An officer of the company says that after the waters had receded it was found that very little damage had been done to the roadway.

The Texas Demurrage and Storage Bureau during the past three years reports earnings as follows:

	Demurrage	Storage
1909-10.....	\$300,709	\$37,075
1910-11.....	289,554	39,459
1911-12.....	375,502	34,258

In each year from 6 to 10 per cent. of the demurrage earnings were remitted or refunded.

Freight agents of the Southern Railway at cities in the northern, central and western states have been instructed to report to the freight traffic manager at Washington in regard to possibilities for developing in their several territories, additional markets for agricultural and other commodities produced in the southeastern states, giving any facts available which may be helpful to southern shippers.

At the suggestion of the Interstate Commerce Commission the Southern Classification Committee has postponed the effective date of classification No. 39 until August 1, for the purpose of conference with the state commissions and with those shippers who are protesting against the classification or some part of it. The committee will hold a meeting at the St. Charles hotel, Atlantic City, beginning July 8, and has invited the attendance of all persons objecting to any specific item, promising to afford the fullest possible hearing.

Firemen, seamen, oilers and other employees of Atlantic coastwise steamship lines in considerable numbers struck last week and on Monday of this week large numbers of longshoremen in New York City struck in sympathy with the boatmen; and according to the leaders of the strikers many thousands of men have walked out. The officers of the regular steamship lines say, however, that the strike has not been so serious as is claimed, at the same time declaring that nearly or quite all of the regular sailings have been made according to schedule.

The International Apple Shippers' Association is to hold its annual convention in Chicago August 7, 8 and 9. Wholesale dealers in apples say that the prospects are good for heavy crops of apples this year in all of the states which have large areas devoted to orchards. The crop in the United States last year aggregated 30,000,000 barrels, and this year the experts expect that there will be 50,000,000 barrels. In Washington, Oregon and Idaho they expect that the yield will be from 60 per cent. to 75 per cent. greater than it was in 1910, which they calculate will be enough to fill from 16,000 to 18,000 cars.

A temporary organization to be known as the "See America First Association" was formed at a meeting in Chicago on June 28 of passenger traffic officers of western railway and steamship lines. The membership is to include also chambers of commerce, boards of trade, civic organizations and others interested, and the object is to be the exploitation of American scenic wonders. A temporary board of managers was appointed to act until a permanent organization is formed, consisting of the following: W. J. Black, P. T. M., Atchison, Topeka & Santa Fe; J. W. Daly, New York Central Lines; J. Francis, G. P. A., Chicago, Burlington & Quincy; C. A. Cairns, G. P. A., Chicago & North Western; W. J. Cannon, A. G. P. A., Chicago, Milwaukee & St. Paul; F. H. Tristram, A. G. P. A., Wabash, and C. W. Pitts, G. A., Great Northern.

Traffic Club of New York.

The annual outing and clam bake of the Traffic Club of New York will be held at Witzel's Grove, College Point, L. I.,

July 20. A return baseball game will be played with the Traffic Club of Philadelphia, and the entertainment committee will arrange some novel features.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 121-A, giving a summary of car surpluses and shortages by groups from February 15, 1911, to June 20, 1912, says:

"The total surplus on June 20, 1912, was 73,464 cars; on June 6, 1912, was 89,208 cars; on June 21, 1911, was 165,934 cars. Compared with the preceding period there is a further decrease in the total surplus of 15,744 cars. The decrease in surplus coal cars is general throughout the country except, in groups 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida) and 10 (Oregon, Idaho, California, Arizona and Washington). The net decrease in this class of equipment is 16,466 cars. There is a net increase in box car surplus of 2,700 cars. The increase is most apparent in groups 6 (Iowa, Illinois, Wisconsin, Minnesota, and the Dakotas) and 10 (as above). There is also a decrease in miscellaneous cars general throughout the country.

"The total shortage on June 20, 1912, was 5,746 cars; on June 6, 1912, was 2,822 cars; on June 21, 1911, was 2,764 cars. Compared with the preceding period, there is an increase in the total shortage of 2,924 cars, of which 2,227 is in box, 488 in flat and 404 in miscellaneous cars. The increase in box car shortage is general throughout the country except in groups 6 (as above), 9 (Texas, Louisiana and New Mexico) and 10 (as above). Compared with the same date of 1911 there is a decrease in the total surplus of 92,470 cars, of which 26,602 is in box and 2,460 in flat, 53,566 in coal and 9,842 in miscellaneous cars. There is an increase in the total shortage of

2,982 cars, of which 1,502 is in box, 1,055 in flat, 396 in coal and 29 in miscellaneous cars."

The accompanying table gives car surplus and shortage figures of groups for the last period covered in the report, and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1912.

Changes in Express Rates.

The National Dry Goods Association has asked the Interstate Commerce Commission to order modifications in express company rates as follows:

That a system of cheap insurance on merchandise packages should be established. The rate of 10 cents a \$100 is excessive.

A new system should be established to prevent overcharging.

At present to aggregate a shipment containing two or more packages from one shipper to one consignee, all packages weighing under 20 lbs. are rated as 20 lbs. A basis of 10 lbs. or less should be adopted. Provision should be made for penalizing express companies for slow deliveries.

Return charges on C. O. D. collections should be reduced.

Claims against express companies should be settled promptly. It frequently takes two months to settle claims, which it is plainly evident are just.

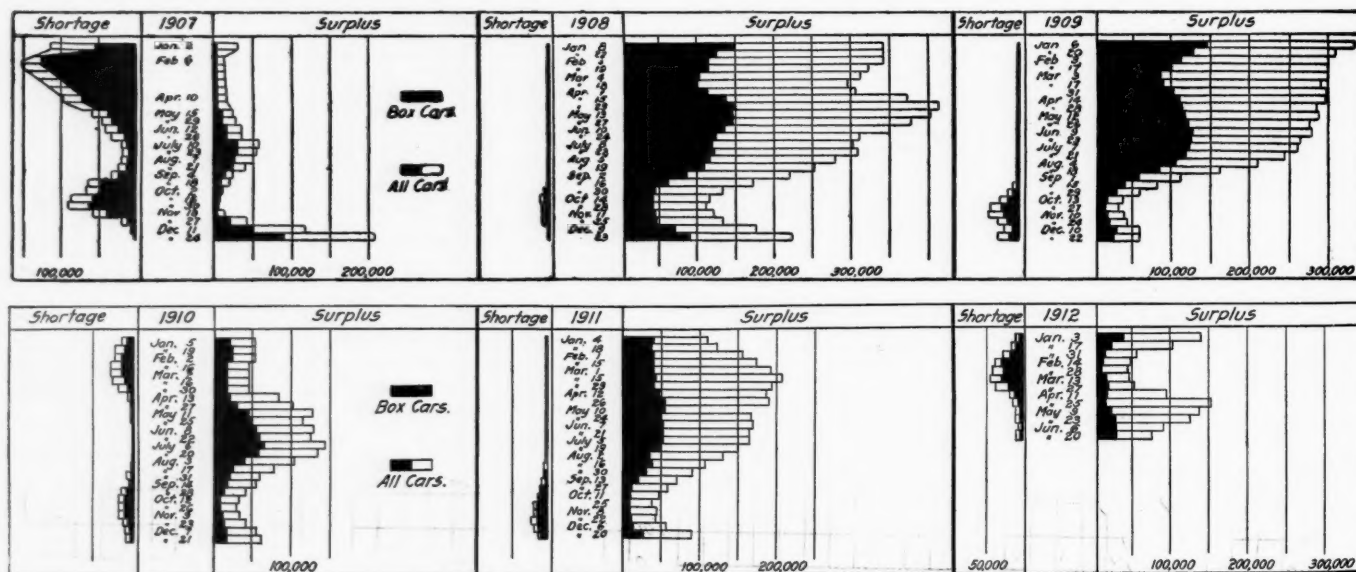
Express company rates are excessive. Either the commission should lower them or action should be taken urging Congress to pass a bill regulating express company service and charges.

Total April Revenues and Expenses.

The Bureau of Railway Economics, bulletin number 35, is given in part herewith. The railways whose returns are included in this bulletin operate 219,185 miles of line, or 90 per cent. of all the steam railway mileage in the United States. The total operating revenues for the month of April, 1912,

CAR SURPLUSES AND SHORTAGES.										
Date.	No. of roads.	Surpluses				Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
Group *1.—June 20, 1912.....	7	17	289	78	124	508	304	240	119	0
" 2.—" 20, 1912.....	25	1,950	126	4,962	1,077	8,115	54	10	135	0
" 3.—" 20, 1912.....	25	3,873	217	5,169	2,880	12,139	325	295	64	60
" 4.—" 20, 1912.....	9	861	125	806	951	2,743	336	266	0	0
" 5.—" 20, 1912.....	20	1,724	26	1,591	966	4,307	75	102	0	0
" 6.—" 20, 1912.....	24	5,816	258	1,612	5,026	12,712	80	56	47	60
" 7.—" 20, 1912.....	4	376	74	138	630	1,218	50	0	10	0
" 8.—" 20, 1912.....	16	3,296	295	1,677	2,537	7,805	0	100	15	0
" 9.—" 20, 1912.....	11	1,186	118	428	1,210	2,942	75	0	50	0
" 10.—" 20, 1912.....	23	7,481	1,793	2,858	8,500	20,632	43	30	10	0
" 11.—" 20, 1912.....	6	26	2	0	315	343	1,827	456	0	452
Total	170	26,606	3,323	19,319	24,216	73,464	3,169	1,555	450	572

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1912.

amounted to \$213,981,018. Compared with April, 1911, the total operating revenues of these railways show an increase of \$4,423,356. These total operating revenues per mile of line amounted to \$976 in April, 1912, and \$975 in April, 1911, an increase for 1912 of \$1, or 0.1 per cent. This increase was the resultant of an increase of 0.3 per cent. in the freight revenue, together with slight increases in other transportation and non-transportation revenue on the one hand, and a decrease of 0.5 per cent. in passenger revenue on the other hand.

Operating expenses amounted to \$157,618,073. This was \$10,449,796 more than for April, 1911. These operating expenses per mile of line amounted to \$719 in April, 1912, and \$685 in April, 1911, an increase for 1912 of \$34 per mile, or 5.0 per cent. Each of the several operating expense accounts showed an increase for 1912. In the cost per mile of maintaining way and structures, there was an increase compared with April, 1911, of 3.3 per cent.; in the cost per mile of maintaining equipment an increase of 8.0 per cent.; in traffic expenses per mile an increase of 3.5 per cent.; in the transportation expenses per mile an increase of 4.7 per cent.; and in general expenses per mile an increase of 1.6 per cent.

Net operating revenue amounted to \$56,362,945. This was \$6,026,440 less than for April, 1911. Net operating revenue per mile of line amounted to \$257 in April, 1912, and \$290 in April, 1911, a decrease for 1912 of \$33 per mile, or 11.4 per cent. The net operating revenue for each mile of line for each day in April, 1912, averaged \$8.57, and for April, 1911, \$9.68.

Taxes for the month of April amounted to \$9,633,327, or \$44 per mile, an increase of 9.4 per cent. over April, 1911.

The operating ratio for April, that is, the per cent. of total operating revenues which was absorbed in operating expenses, was 73.7 per cent., which is comparable with 71.0 per cent. in March, 1912, and 70.2 per cent. in April, 1911.

The eastern group of railways shows a decrease in total operating revenues per mile of line as compared with April, 1911, of 4.2 per cent.; the southern group shows an increase of 7.5 per cent., and the western group an increase of 2.6 per cent. Operating expenses per mile increased 5.8 per cent. on the eastern railways as compared with April, 1911, 11.2 per cent. on the southern railways, and 2.2 per cent. on the western railways. In the eastern group net operating revenue per mile decreased 27.2 per cent. as compared with April, 1911, and in the southern group it decreased 1.6 per cent.; in the western group it increased 3.7 per cent. The increase in taxes per mile, compared with April, 1911, was 10.1 per cent. in the eastern group, and was 12.4 per cent. in the western group, while in the southern group there occurred a negligible decrease.

Comparison of the returns for the ten months of the fiscal year 1912 with those of the corresponding months of the fiscal year 1911 shows a decrease in total operating revenues per mile of 0.3 per cent., an increase in operating expenses per mile of 0.4 per cent., and a decrease in net operating revenue per mile of 1.8 per cent. This net operating revenue per mile of the eastern group of railways increased 4.2 per cent. as compared with the corresponding period for 1911, that of the southern group decreased 6.8 per cent., and that of the western group decreased 5.1 per cent.

The accompanying diagram presents graphically the variations by months in total operating revenues, the operating expenses and net operating revenue per mile of line for the calendar year 1911 and for the calendar year 1912 to date, for all roads and for the roads of the three groups separately. The points on the lines for the different months indicate the level attained by the revenues, expenses, and net revenue per mile for the respective months.

Per Cent. of Total Operating Revenues Consumed by:	April,		Fiscal year ended June 30,		Calendar year ended December 31,	
	1912.	1911.	1911.	1910.	1911.	1910.
Maintenance of way and structures	13.6	13.1	12.5	12.7	12.7	12.13
Maintenance of equipment.....	16.8	15.6	14.9	14.5	15.5	15.3
Traffic expenses	2.3	2.2	2.1	2.0	2.1	2.1
Transportation expenses	38.3	36.6	34.2	32.2	35.4	34.7
General expenses	2.7	2.7	2.4	2.3	2.6	2.4
Total operating expense....	73.7	70.2	66.1	63.7	68.3	67.8

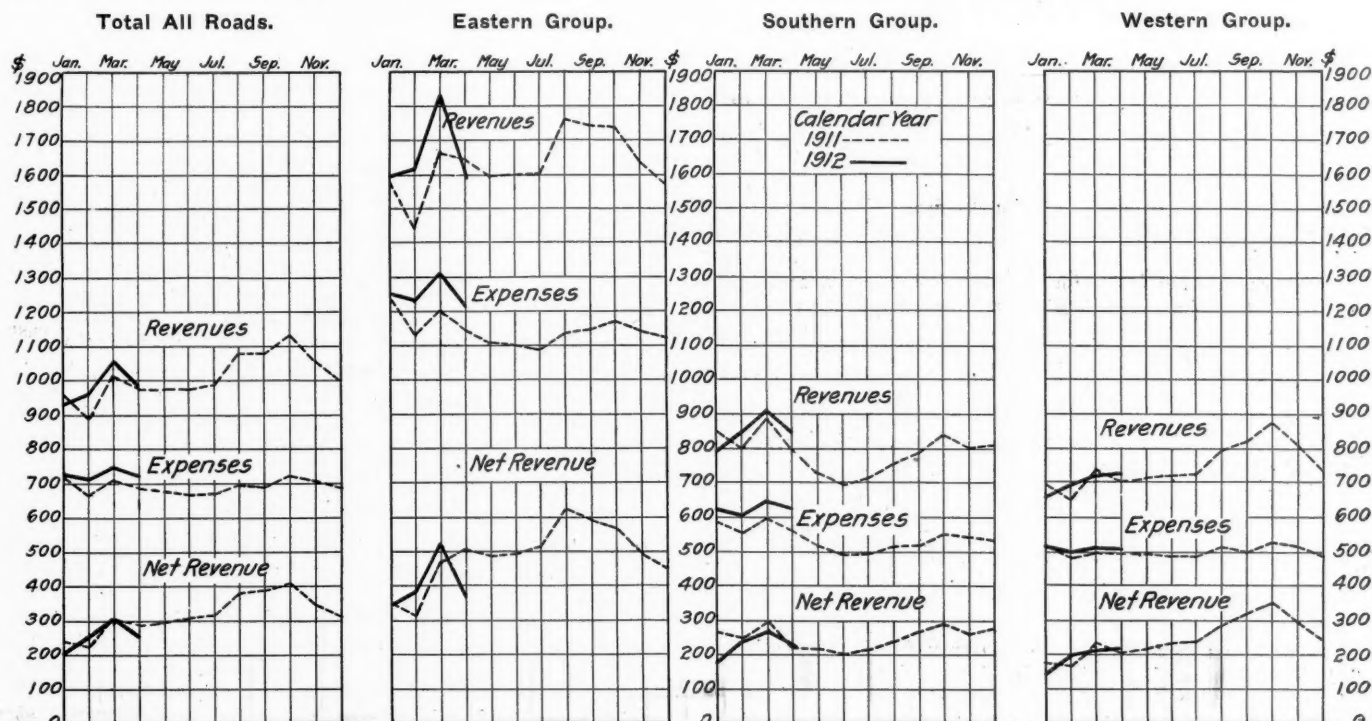
INTERSTATE COMMERCE COMMISSION.

The commission has suspended until October 29, 1912, the supplements to the Chicago, Rock Island & Pacific tariff which advance class rates between certain points in Minnesota and Iowa.

The commission has suspended until October 29, 1912, certain portions of tariffs which increase class rates from Chicago, Ill., St. Louis, Mo., and other points to Watertown and other stations in South Dakota.

The commission has suspended until October 19, 1912, portions of the tariffs which increase class and commodity rates, via rail and lake, from points in Trunk Line and Central Freight Association territory to Minneapolis, Minn., and other points.

The commission has suspended from July 1 until October 29, 1912, certain portions of Leland's tariff which increase the rates



Monthly Revenues and Expenses per mile of Line in 1911 and 1912.

for the transportation of cantaloupes, potatoes and other fruits and vegetables from Ruston, La., and other Louisiana points to Chicago, Ill., and other points.

The commission has further suspended from July 5, 1912, until January 4, 1913, the tariff of the Western Maryland, containing advanced rates for the transportation of cement, in carloads, from Union Bridge, Md., to Norfolk, Va., and other destinations.

The commission has suspended until October 29, 1912, advances in rates for the transportation of lard from Rapid City, S. D., to Chicago and other points, contained in supplements to the Chicago, Milwaukee & St. Paul tariff, effective July 1, 1912.

The commission has suspended until October 28, 1912, the supplement to the St. Louis, Rocky Mountain & Pacific tariff, canceling the existing joint rates on coal from Cunningham, Koehler, Preston, Raton and other points in New Mexico to points in Oklahoma and Texas on the Wichita Falls & Northwestern system, leaving combination rates to apply. The cancellation of the joint rates and applications of combination rates will result in advances of from 75 cents to \$1 per net ton.

The commission has suspended from July 3 until October 31, 1912, the Southern Pacific Atlantic Steamship Lines tariff, canceling the existing joint rates for the transportation of cypress lumber, laths and shingles from points on the New Orleans, Texas & Mexico in Louisiana to Albany, N. Y., and a number of other cities in the Northeast, leaving combination rates to apply. The cancellation of the joint rates, which has been suspended by the commission, would result in increases ranging from 1/2 cent to 2 1/4 cents per 100 lbs.

Rates on Cement Reduced.

Oklahoma Portland Cement Co. v. Missouri, Kansas & Texas et al. Opinion by Commissioner Harlan:

The commission found that the present rate of 17 cents per 100 lbs. on cement in carloads from Ada, Okla., to Shreveport, La., was unreasonable to the extent that it exceeded 15 cents per 100 lbs. No order will be issued, but the defendants will be expected to readjust their rates in accordance with this conclusion. (24 I. C. C., 158.)

Baggage Rate Advances Suspended.

In re investigation and suspension of certain new rules and regulations restricting the dimensions of trunks and other articles handled as baggage by carriers operating throughout the United States.

The commission has suspended from July 1 until October 29 the proposed advances in baggage rates, schedules for which have been filed by nearly all the railways in the country.

Operation of the Fourth Section in the Transportation of Salt.

In re applications for relief from the operation of the fourth section in regard to certain rates on salt. Opinion by Chairman Prouty:

The commission denied permission to direct lines to maintain higher intermediate charges for their transportation of salt in violation of the fourth section, but decided that where the direct line observes the fourth section, a competing line, whose mileage exceeds that of the direct line by not less than 15 per cent., will be permitted to meet the rate of the direct line without reducing its present intermediate charge. (24 I. C. C., 192.)

Reparation Awarded.

Dierks & Sons Lumber Co. v. Missouri Pacific et al. Opinion by Commissioner Harlan:

The commission decided that the defendants, in accordance with the conclusions arrived at in *Leonard v. Kansas City Southern*, 13 I. C. C., 573, should absorb \$3 a car of the charges of the Kansas City & Westport Belt on shipments to complainant's yards lying outside the defendants' switching district. (24 I. C. C., 205.)

Traffic Bureau of the Sioux City Commercial Club v. Anderson & Saline River et al. Opinion by Commissioner Harlan:

The commission found that the rate of 30 cents per 100 lbs. for the transportation of yellow pine lumber in carloads from points in Arkansas, Louisiana, Mississippi and Texas to Sioux

City, Iowa, was unreasonable to the extent that it exceeded 28 cents per 100 lbs. (24 I. C. C., 177.)

Riverside Mills v. St. Louis & San Francisco et al. Opinion by the commission:

Upon complaint alleging that the prescribed minimum carload weight and rates applicable to the transportation, under defendants' tariffs, of cotton waste and cotton-factory sweepings were unreasonable, the commission arrived at the following conclusion: The minimum weight of 24,000 lbs. applicable to the transportation of cotton-factory sweepings from Cordova, Ala., to Augusta, Ga., was unreasonable to the extent it exceeds the minimum of 15,000 lbs. subsequently established. Reparation was awarded. A rate of 40 cents per 100 pounds for the transportation of less-than-carload lots of cotton-factory sweepings from Lindale, Ga., to Paducah, Ky., was unreasonable to the extent it exceeded the rate of 32 cents subsequently established. Reparation was awarded. When a shipment of cotton-factory sweepings or cotton waste is tendered to the carrier which requires a car of greater capacity than can be furnished by the carrier, two or more smaller cars should be furnished and charges assessed upon basis of the actual weight of the shipment, but not less than the minimum weight prescribed in the tariff for a carload. Reparation was awarded. A rate of \$1.89 and carload minimum weight of 30,000 lbs., applicable to the transportation of cotton waste from Augusta, Ga., to Clifton, Ariz., is not, upon the record, shown to have been unreasonable. (24 I. C. C., 264.)

Complaint Dismissed.

F. G. Alexander v. St. Louis & San Francisco. Opinion by the commission:

The commission found that as the complainant had been given due notice of arrival, the carrier was in accord with the provisions of its tariff in assessing demurrage charges. (24 I. C. C., 253.)

Rosenbaum Brothers v. Baltimore & Ohio et al. Opinion by Commissioner Harlan:

The privilege of stopping grain in transit at certain points in Ohio on the through rate from the point of original shipment to the ultimate destination was subsequently extended to Sandusky, at which point it had not been fully applicable. Reparation is denied on shipments that moved in the meantime. (24 I. C. C., 287.)

New Pittsburgh Coal Co. v. Hocking Valley. Opinion by Commissioner Meyer:

The commission decided that it had no jurisdiction over the transportation of vessel-fuel from a point within the state of Ohio to a port of that state, the rail transportation not going outside of the state and the ultimate delivery being made to the vessel at the dock. The commission also found that the rate of 75 cents per net ton for the transportation of lake-cargo coal in carloads from the Hocking district of Ohio to the docks at Toledo, Ohio, when for trans-shipment by vessel to points without that state, was not unreasonable. (24 I. C. C., 244.)

Lumbermen's Exchange of St. Louis v. Anderson & Saline River et al. Opinion by Chairman Prouty:

In January, 1911, the defendants advanced rates both on hardwood and yellow pine from points of production in the Southeast to St. Louis one cent per 100 lbs. The complainants now attack the lawfulness of this advance. The commission decided that as the net earnings of the defendants had been decreasing in recent years, and as the present increase in rates improved the rate adjustment in that territory, they were just and reasonable and should not be disturbed. (24 I. C. C., 220.)

Elevation Allowances.

In re elevation allowances at points located upon the Missouri, Mississippi and Ohio rivers, and on the Great Lakes. Opinion by Chairman Prouty:

It appearing that prior proceedings in regard to these elevation allowances comprehended Missouri river points only, this proceeding was brought so as to include Ohio river points and points generally north of the Ohio river and east of the Missouri river. One-fourth of 1 cent per bushel was held to be fair compensation for transportation elevation at the points in ques-

tion, but for both transportation elevation and commercial elevation at such points a fair compensation would be not less than three-fourths of 1 cent per 100 pounds. A scale of charges for commercial elevation was recommended. Making of any order in this matter is postponed until reasonable opportunity has been given the parties for an adjustment on the basis recommended. Nothing in the testimony tends to convince the commission that transportation elevation can not be brought within the 10-day limit. (24 I. C. C., 197.)

Less Than Carload Rates Reduced.

Railroad Commission of Oregon v. Southern Pacific et al. Opinion by the commission:

Through rates on less-than-carload shipments to points south of Portland, Ore., in the Willamette valley from the Missouri river and the territory east had for a number of years been constructed by adding to the rates from that territory to Portland an arbitrary of 10 cents per 100 lbs. On March 22, 1910, a new basis was adopted, the through rates being made by a combination of the transcontinental rates to Portland and the local rates from Portland to the destination. The commission decided that the rates made up of a combination of the transcontinental rates and the local rates were unjust and unreasonable and prescribed reasonable rates for the future. (24 I. C. C., 273.)

Electric Railway Fares Reduced.

J. H. Bitzer v. Washington-Virginia Railway Co. Opinion by the commission:

The commission found that the passenger fares of the defendant, which operates a system of electric railway lines between Washington, D. C., and points in Virginia, are unreasonable and prescribed lower fares for the future. The one-way and round-trip passenger fares between Washington and certain points on the defendant's Falls Church line were also found to be unreasonable and lower fares were prescribed for the future. As the defendant provides commutation rates between Washington and certain points on its lines, it should, to avoid undue discrimination, provide commutation rates for travel under similar conditions between Washington and other points on its lines. (24 I. C. C., 255.)

Cement Rates Increased.

In re investigation and suspension of advances in rates by carriers for the transportation of cement in carload lots. Opinion by Commissioner Meyer:

The defendants seek to advance their rates on cement in carloads from 10 to 12½ cents per 100 lbs. from Mildred, Iola, Chanute and Gas, Kan., to all stations on the St. Louis & San Francisco between Springfield, Mo., and St. Louis, and to increase their rates on the same commodity from the same points of origin to certain points on the Missouri, Kansas & Texas in western Missouri. These advances have been suspended until September 30, 1912. The proposed tariffs also contain a few minor advances which are not complained of and some reductions. The defendants claim that the advances were filed to correct minor tariff discrepancies and to improve the present rate adjustment. The commission decided that the proposed advances were reasonable and will issue an order vacating the order of suspension. (24 I. C. C., 209.)

Utah Coal Mines Discriminated Against.

Consolidated Fuel Co. et al. v. Atchison, Topeka & Santa Fe. Opinion by Commissioner Harlan:

The commission found that the present adjustment of rates from the Utah coal mining districts and from the Rock Springs coal fields to points on the Oregon Short Line and its connections in Idaho, Montana, Washington and Oregon was unduly discriminatory against the Utah mines in favor of the Rock Springs coal fields, and ordered that the differential against the Utah mines be reduced to 25 cents a ton. The commission also ordered the defendants to establish through routes and joint rates from the Utah mines to all points taking such rates from the Rock Springs mines. Certain rules and practices of the Denver & Rio Grande respecting the distribution of its coal car equipment were criticized. The right of the complainants to have the routes and rates, so prescribed, extended back over their industrial lines to their respective mines was reserved for further examination. (24 I. C. C., 213.)

Refrigeration Rates on Fruits and Vegetables Not Increased.

In re investigation and suspension of advances in rates by carriers for the transportation of fruits and vegetables under refrigeration from stations on the Western Maryland to various interstate points. Opinion by Commissioner Clements:

The proposed advances in rates for the refrigeration of fruits and vegetables from shipping points on the Western Maryland to various eastern destinations, including Washington, D. C., New York city and points in Maryland, Delaware, New Jersey, Pennsylvania and West Virginia were not found to be reasonable, and the commission will order the cancellation of the proposed increases in these rates. Other rates to the West and the South contained in the same tariff but against which no protest is made will be allowed to become effective without any specific finding as to their reasonableness. (24 I. C. C., 164.)

Bowling Green Discriminated Against.

Bowling Green Business Men's Protective Association of Bowling Green, Ky., v. Louisville & Nashville et al. Opinion by Commissioner Meyer:

The complaint alleges that the freight rates in general to and from Bowling Green, Ky., are not established with proper relation to the rates to and from Clarksville and Nashville, Tenn., Evansville, Ind., and Louisville, Ky. The Louisville & Nashville, for itself and its connections, seeks authority to continue to charge lower rates to and from Louisville, Clarksville, and Nashville than to and from Bowling Green. The defendants seek to justify this discrimination against Bowling Green on the ground that there is water competition at the other points which does not exist at Bowling Green and competition of rail carrier with rail carrier, intensified by market competition.

The commission finds that the facts reveal a community of interest between the water and rail carriers serving Bowling Green, the effect of which is to deprive it of the benefit of water competition which it should enjoy under normal and natural conditions, and that under a situation such as disclosed in this proceeding, the rail carrier cannot justify its discrimination against Bowling Green in favor of Louisville and Clarksville on the ground that its rates to and from all three points properly reflect the water competition existing at them. Were it not for the affiliation between the rail carrier and the water carrier there would not be sufficient actual dissimilarity between the circumstances and conditions surrounding the transportation by water to and from Bowling Green, Nashville, and Clarksville to justify relieving the Louisville & Nashville from the operation at Bowling Green of the long-and-short-haul clause.

The railway competition at Louisville and Clarksville is not of sufficient force and effect to justify a lower scale of rates at those points than at Bowling Green on traffic the movement of which is through Bowling Green.

The fact that Nashville is recognized as a commercial center of more importance than Bowling Green and enjoys a far greater volume of trade does not warrant the continuance of a relation of rates between that point and Bowling Green which results in undue preference to the one and undue prejudice to the other. The law contemplates relatively fair rates as between different points, and one of its prime objects is to cure the practice of carriers, formerly so prevalent, of favoring one point over another when the favored point possesses no advantages over the other with respect to real competition either by water or rail.

The commission found that the defendants' rates to and from Bowling Green were unjustly discriminatory in and to the extent that they exceeded the rates applicable through Bowling Green to and from Nashville.

The rate of 20 cents on sugar from New Orleans to Bowling Green does not bear an unreasonable relation to the rate of 17 cents to Louisville, and the defendants will be relieved from the operation of the fourth section of the act so far as this traffic is concerned.

The rates to Montgomery, Ala., from Bowling Green, as compared with the rates to Montgomery from Clarksville, are unjustly discriminatory, and for the future the rates from Bowling Green to Montgomery should not exceed the rates from Clarksville to Montgomery.

On oranges from Jacksonville, Fla., to Bowling Green the defendants are not entitled to apply a rate in excess of the rate on the same commodity from Jacksonville to Louisville.

The evidence respecting complainant's request for a double-

deck car rate on hogs from Bowling Green to Chicago is not sufficient to enable the commission to reach a conclusion in the matter. This item in the complaint can not be disposed of without going into the larger question of the use of double-deck cars. (24 I. C. C., 228.)

Changes in Lime Rates.

In re investigation and suspension of advances in rates by carriers for the transportation of lime in carloads from Dittlinger, Tex., to New Orleans, La., and between other points. Opinion by Chairman Prouty:

In 1911 the rates on lime from Texas points were reduced to give Texas producers a better opportunity to sell in New Orleans and neighboring markets. Immediately after, the other producers demanded corresponding reductions. The Texas lines saw that if they maintained the lower rates from Texas they would have to reduce their rates from other points. They therefore restored the higher rates from Texas points. The Texas producers immediately protested against this advance and the advances were suspended by the commission. The commission found that the proposed advances were unreasonable to the extent that they exceeded rates set by the commission in its report. (24 I. C. C., 170.)

Lower Flour Rates via Flour City Steamship Company.

Flour City Steamship Co. et al. v. Lehigh Valley et al. Opinion by Commissioner McChord:

The Flour City Line is a co-partnership which for one season operated under a charter party line of steamers between Duluth and Buffalo, between which points it transported flour at a proportional rate of 6.3 cents per 100 lbs. Since the complaint was filed the Flour City Steamship Company, a corporation organized in Minnesota, has taken over the affairs of the Flour City Line. The rail carriers west of Duluth published a proportional rate of 5 cents to Duluth and issued through bills of lading to New York in connection with the Flour City Line. The railways east of Buffalo declined to establish a through route in connection with the boat line, refused to recognize the through bills of lading, and accepted the traffic at Buffalo only upon local bills of lading at the local rate of 11 cents. There is now an established through route and joint rate of 23 cents between Minneapolis and New York restricted to movement via steamship lines owned by railways, and out of this joint rate the railways east of Buffalo receive 9.2 cents and absorb the handling charges from the end of the steamers' gangplank. The complainant seeks to have a through route and joint rate of 20.5 cents established in connection with the Flour City Steamship Company. The defense is that the existing joint rate is reasonable and has been so found by the commission; that this complaint is a strategic move to obtain a reduction in the rate heretofore found reasonable; that there now exist ample and satisfactory through routes for the handling of this traffic, and that the Flour City Steamship Company is not a bona fide common carrier and cannot be made a party to a through route. The commission arrived at the following conclusions: The publication of proportional rates by the western carriers and by the Flour City Line covering the through movement from Minneapolis to Buffalo when for beyond, the actual movement of traffic upon through bills of lading from Minneapolis at least to Buffalo, and the prepayment of freight charges in some instances through to New York and in others to Buffalo, necessitating an accounting between carriers, is evidence of a common arrangement for a continuous shipment, and therefore the Flour City Line is a common carrier and as such is subject to the jurisdiction of the commission and capable of forming a part of the through route.

Though the charter of the boats operated by the Flour City Line has expired since that line was taken over by the Flour City Steamship Company and has not been renewed, and though no other ships have been acquired by the corporation whose stock, while over-subscribed, has not been paid in, even in part, the corporation has a right to obtain from the commission an expression as to whether or not it will be made a party to the through route when it is physically and financially capable of transporting the traffic, there being nothing to cast any shadow upon the bona fides of the corporation. This is in accordance with the conclusions reached in *Suffern Grain Co. v. Illinois Central*, 22 I. C. C., 178.

The existence of through routes capable of adequately and expeditiously handling all traffic offered, though entitled to much

consideration, does not constitute a bar to the establishment of another through route.

The 9.2 cent revenue accruing to the eastern railways, while more or less arbitrarily determined by a fixed percentage of the 16.7 cent all-rail grain rate from Chicago to New York, is nevertheless a division of a joint rate and cannot be said to have been established without some reference to the division received by the railway owned lake lines, and the commission is not prepared to hold that its acceptance only on traffic transported via the steamship lines owned by railways constitutes a discrimination between carriers which is prohibited, nor is the commission prepared to find that this division is an absolute measure of the reasonableness of the division that should accrue to the eastern railways on traffic reaching them at Buffalo via steamers in which they have no interest.

The common ownership of rail and lake facilities of transportation has resulted in a reduction of the difference between the cost of rail and water transportation in this territory, and while there may not yet be any statutory inhibition against this common ownership, the uses which it has subserved cannot be said to be entirely in accordance with the spirit of the law.

The defendants will be required to honor the through bills of lading issued by the western carriers in connection with the Flour City Steamship Company, and while the commission does not undertake to establish a joint rate, it is of the opinion that on traffic moving via this steamship company, the eastern carriers should not receive a division in excess of 11 cents per 100 lbs., which should cover the handling of the traffic from the end of the gangplank.

It is the duty of the defendants to provide facilities for the receipt and handling of the flour that reaches Buffalo via the complainant company, and if their present facilities are inadequate, facilities must be provided elsewhere and at a charge no greater than would apply via their own docks.

If the defendants find their docks inadequate to accommodate complainants' vessels, they must receive the freight arriving via the Union docks and moving over the Pennsylvania Railroad to their rails and accord such traffic the same rate as they apply from their own docks. This will necessitate the absorption of the handling charges from the end of the gangplank at the Union docks and the \$2.10 switching charges of the Pennsylvania Railroad.

No order will be made, but the complainants will be left to perfect their transportation facilities and the defendants to conform to the views expressed. (24 I. C. C., 181.)

STATE COMMISSIONS.

Commissioner Williams of Texas has given in a memorandum the opinion that a railway under construction should pay demurrage, but not per diem.

H. L. Drayton, K. C., corporation counsel for the City of Toronto, succeeds the late Mr. Justice Mabey as chairman of the Canadian Railway Commission.

The Washington railway commission has issued an order requiring the Northern Pacific to readjust its distributive class rates so that freight rates from Tacoma to eastern Washington shall not exceed the rates from Seattle. The railways had established mileage rates pursuant to a former order of the commission by which the rates from Tacoma exceeded those from Seattle.

The Illinois Central, operating over 60 per cent. of the railway mileage in Mississippi, has applied to the Supreme Court of the state for an injunction against the enforcement of the order of the state railway commission requiring screens in passenger cars. According to the commission's order every window in every passenger car must have mosquito screens at all times between May 1 and October 1.

The Louisiana commission at its meeting on June 27 issued an order prescribing five days as the limit within which railways must respond to requests from shippers to trace shipments of freight. The Merchants' Bureau of New Orleans had asked that the time limit be made three days. The order applies to "tracers accompanied with a complaint from the consignee to the consignor to the effect that goods have not reached destination within five days after shipment"; and the railway company must explain the cause of the delay within five days after the receipt of the request from the shipper.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

E. G. H. Kessler has been appointed comptroller of the Ohio River & Columbus, the Cincinnati, Georgetown & Portsmouth, and the Felicity & Bethel, with office at Cincinnati, Ohio.

Maximilian M. Stallman, general attorney of the Delaware, Lackawanna & Western at New York, has resigned to engage in the general practice of law, with offices at Newark, N. J.

George T. Reid, assistant to the president of the Northern Pacific at Tacoma, Wash., has been elected also president of the North Yakima & Valley, succeeding George Donald, resigned.

T. S. Ford, auditor of the Wichita Falls & Northwestern, the Wichita Falls & Southern and the Wichita Falls & Wellington, with office at Wichita Falls, Tex., has resigned, effective July 15.

T. O. Edwards, auditor of freight accounts of the Southern Pacific at San Francisco, Cal., has been appointed auditor of the Missouri, Kansas & Texas, with office at St. Louis, Mo., succeeding W. L. Seelig, resigned.

C. M. Kittle, freight claim agent of the Illinois Central at Chicago, has been appointed assistant to the president, with office at Chicago. B. D. Bristol has been appointed freight claim agent, with office at Chicago, succeeding Mr. Kittle.

T. Rumney, assistant second vice-president of the Rock Island Lines at Chicago, has been appointed also assistant vice-president in charge of mechanical matters of the St. Paul & Kansas City Short Line. (See item under Engineering and Rolling Stock Officers.)

Herbert A. Taylor, assistant general solicitor of the Erie Railroad, at New York, has been appointed commerce counsel. Mr. Taylor was born on October 6, 1876, at Beverly, N. J., and graduated from Cornell University in 1897. The following year he attended Buffalo Law School, and in July, 1899, went to the Erie Railroad as managing clerk in the legal department. He remained in this position until 1904, when he was made assistant general solicitor. Theodore H. Burgess, assistant to general solicitor, has been appointed assistant commerce counsel, and Charles S. Goldsborough, president's assistant, has been appointed assistant to the president, all with offices at New York.

Operating Officers.

J. J. Kinsella, general yardmaster of the Chicago Junction Railway, has been appointed trainmaster, with office at Chicago.

H. E. McGee has been appointed trainmaster of the Missouri, Kansas & Texas of Texas, with headquarters at Smithville, Tex., succeeding L. A. Busby, assigned to other duties.

E. W. Scheer has been appointed assistant to the general superintendent of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio.

J. B. Kirkpatrick, trainmaster of districts thirty-one and thirty-two of the Grand Trunk at Ottawa, Ont., has been appointed superintendent of the Grand Trunk Pacific, with headquarters at Winnipeg, Man.

A. H. Elfner, superintendent of the Ohio River & Columbus, the Cincinnati, Georgetown & Portsmouth, and the Felicity & Bethel at Cincinnati, Ohio, has been appointed general superintendent, with office at Cincinnati.

C. J. Fellows, superintendent of car service of the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been transferred to Baltimore, Ohio, where he will be in charge of the C. H. & D. division of the car service bureau of the Baltimore & Ohio system.

J. M. Doyle, assistant superintendent of the Marcus division of the Great Northern, has been appointed superintendent of that division, with office at Marcus, Wash., succeeding R. C. Morgan, resigned to accept service with another company. B. Lantry, trainmaster at Havre, Mont., has been appointed trainmaster of the Marcus division. F. L. Hay has been appointed superintendent of the dining and sleeping car depart-

ment of the Great Northern, with office at St. Paul, Minn., succeeding T. A. Forbes, resigned.

J. H. Clark, master mechanic and chief engineer of ferries of the Staten Island Railway, the Staten Island Rapid Transit, and the Baltimore & New York, with headquarters at Clifton, Staten Island, N. Y., has been appointed superintendent, succeeding P. H. Cassidy, transferred. Mr. Clark will have jurisdiction over the transportation, maintenance of way and mechanical departments, and will also have the title and perform the duties of assistant superintendent of floating equipment.

Lockett Gwin Coleman, whose appointment as superintendent of the Grand Trunk, with office at Ottawa, Ont., has been announced in these columns, was born on December 7, 1877, and was educated at Harvard University. Mr. Coleman began railway work on October 1, 1900, with the Grand Trunk, and held various positions with that company and later with the Delaware, Lackawanna & Western. He then went to the Rogers Locomotive Works, and in May, 1902, returned to the service of the Grand Trunk as trainmaster. He was later appointed assistant superintendent of the same company, which position he held at the time of his recent appointment as superintendent, as above noted.

A change has been made in the operating limits of the Minnesota, Dakota and Des Moines Valley divisions of the First district of the Chicago, Rock Island & Pacific by which that portion of the Minnesota division from mile post 97.885, west end of Iowa Falls freight yard to mile post 206, Estherville; and that portion of the Des Moines Valley division from Valley Junction to mile post 534.53, Sibley, Iowa, have been transferred to the Dakota division. Iowa Falls terminals remain under the jurisdiction of the Minnesota division.

A. E. Wallace has been appointed superintendent of the Minnesota division of the Rock Island Lines, with office at Cedar Rapids, Iowa, succeeding W. H. Given, resigned; and F. W. Rosser, trainmaster of the Illinois division at Rock Island, Ill., has been appointed superintendent of the Dakota division, with office at Estherville, Iowa, succeeding C. J. Wilson, resigned.

As has been announced in these columns, W. M. Whitenton, general manager of the First district of the Rock Island Lines at Des Moines, Iowa, has been appointed also general manager of the St. Paul & Kansas City Short Line, succeeding to part of the duties of F. C. McMillan, vice-president and general manager, the latter continuing as vice-president. F. J. Easley, general superintendent of the First district of the Rock Island Lines at Des Moines, has been appointed also assistant general manager of the St. P. & K. C. S. L., and the following officers of the Rock Island, with office at Chicago, have had their jurisdiction extended over the St. P. & K. C. S. L.: C. H. Hubbell, superintendent of telegraph; J. R. Pickering, acting superintendent of car service, and O. Maxey, supervisor of weights. A. E. Wallace, whose appointment as superintendent of the Minnesota division of the Rock Island Lines, with office at Cedar Rapids, Iowa, as announced in this issue, has been appointed also superintendent of the St. P. & K. C. S. L., succeeding W. A. Sours, assigned to other duties. (See item under Engineering and Rolling Stock Officers.)

William Doherty, assistant general manager of the St. Louis, Brownsville & Mexico at Kingsville, Tex., in addition to his other duties, has been given jurisdiction over all freight loss and damage claims, tracing carload and less-than-carload freight, diversion orders and the disposition of unclaimed, refused and damaged freight. R. F. Carr, superintendent of the Red River division of the St. Louis & San Francisco at Francis, Okla., has been appointed superintendent of the St. Louis, Brownsville & Mexico. C. F. Hopkins, chief clerk to general manager of the St. Louis & San Francisco at Springfield, Mo., has been appointed superintendent of the Red River division, with office at Francis, Okla., succeeding R. F. Carr.

Changes have been made in the southern division of the Missouri Pacific-Iron Mountain system by which the Arkansas division, with headquarters at Little Rock, Ark., comprises the Hoxie and Little Rock districts, the Hot Springs, Womble, Pike City and Nashville branches and Little Rock terminals; the Valley division, with headquarters at McGehee, Ark., instead of at Monroe, La., as formerly, comprises the Pine Bluff, McGehee,

Lake Providence, Hamburg and Eudora districts and Warren and Arkansas City branches; the Louisiana division, with headquarters at Monroe, La., comprises the Monroe, Lake Charles, Gurdon and Felsenthal districts, the Huttig, Farmerville and Black River branches and the Monroe terminal; and the Natchez division, with headquarters at Ferriday, La., has been abolished. A. A. Abell, superintendent of the Valley division at Monroe, La., has been appointed superintendent of the Louisiana division, with headquarters at Monroe. C. M. Andrews, superintendent of the Natchez division, has been appointed superintendent of the Valley division, with office at McGehee, Ark. W. E. Brooks, superintendent of the Colorado division at Pueblo, Col., has been appointed superintendent of the Illinois division, with office at Chester, Ill., succeeding W. E. Merrifield, transferred, and T. A. Shea, superintendent of the White River division at Aurora, Mo., succeeds Mr. Brooks at Pueblo. D. W. Hickey, trainmaster at Poplar Bluff, Mo., has been appointed acting superintendent of the White River division, in place of Mr. Shea.

John W. Eber, whose appointment as general superintendent of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, Ont., has been announced in these columns, was born on July 14, 1871, at Jersey Shore, Pa. He began railway work on February 28, 1890, as a rodman on the West Shore, now a part of the New York Central & Hudson River, and for the ten years following was in the engineering department of that road. From 1900 to 1904 he was supervisor of track of the New York Central, and then for one year was division engineer of the Rome, Watertown & Ogdensburg division. Mr. Eber was engineer of track from 1905 to 1909, and in April, 1909, was appointed assistant superintendent of the New York Central stockyards at Buffalo, N. Y. In March, 1910, he was appointed superintendent of the Adirondack division of the same road, which position he held at the time of his appointment on May 15, as general superintendent of the Toronto, Hamilton & Buffalo, as above noted.

Traffic Officers.

Charles A. Redden has been appointed general agent of the Frisco Refrigerator Line, with office at St. Louis, Mo., succeeding E. P. Lannan, resigned to engage in other business.

Paul J. Fischer, traveling freight agent of the Wabash at Memphis, Tenn., has been appointed commercial agent, with office at New Orleans, La., where an agency of the road was established, effective July 1.

E. K. Voorhees, first assistant general freight agent of the St. Louis & San Francisco, has been appointed a member of the Uniform Classification Committee, succeeding H. A. Poveleite, general freight agent of the Queen & Crescent.

W. M. Powers, chief clerk in the general freight office of the St. Louis & San Francisco, at St. Louis, Mo., has been appointed assistant general freight agent, with office at St. Louis, succeeding E. K. Voorhees, who has been appointed a member of the Uniform Classification Committee.

John T. Johnston, division freight agent of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Pittsburgh, Pa., has been appointed assistant general freight agent, with office at Pittsburgh. E. F. Austin, commercial agent at Columbus, Ohio, succeeds Mr. Johnston, and H. H. Gray, division freight agent of the Northwestern system of the Pennsylvania at Cambridge, Ohio, succeeds Mr. Austin.

Gilbert K. Mitchell has been appointed traveling freight solicitor of the Star Union Line of the Pennsylvania Lines West in connection with the Ironton, Ohio, agency, succeeding Lester Howard, transferred. E. L. Mountfort has been appointed traveling freight solicitor in connection with the Birmingham, Ala., agency; James G. Parnell in connection with the Atlanta, Ga., agency, and Louis J. Reinhardt in connection with the New Orleans, La., agency.

Engineering and Rolling Stock Officers.

Gerald B. Howard has been appointed chief engineer of the Middle Tennessee and the Nashville Interurban, with office at Nashville, Tenn.

H. T. Douglas, Jr., chief engineer of the Wheeling & Lake Erie, at Cleveland, Ohio, has been appointed chief engineer of the Chicago & Alton, with office at Chicago.

The following officers of the Rock Island Lines have had their jurisdiction extended over the St. Paul & Kansas City Short Line: T. Rumney, assistant vice-president in charge of mechanical matters, with office at Chicago; W. H. Peterson, engineer maintenance of way, with office at Des Moines, Iowa, Mr. Peterson succeeding H. L. Jackson, engineer, assigned to other duties; J. B. Kilpatrick, mechanical superintendent, with office at Des Moines, the position of superintendent of motive power of the latter road having been abolished, and J. R. Ruxton having been assigned to other duties. (See item under Operating Officers.)

OBITUARY.

C. W. Smith, formerly general manager of the Atchison, Topeka & Santa Fe, died at Pasadena, Cal., on July 1. Mr. Smith was born on September 5, 1831, at Austerlitz, Columbia county, N. Y., and began railway work in 1855 as a local agent on the Columbus, Piqua & Indiana. From 1857 to 1862 he was general freight agent of that road, and was later general freight agent on the Columbus, Chicago & Indiana Central, and the Pittsburgh, Cincinnati & St. Louis. From 1872 to 1875 he was general manager of the Indianapolis, Bloomington & Western. He was then general freight agent of the Chicago, Burlington & Quincy, and from May, 1878, to April, 1880, was traffic manager of that road. He was then for one year traffic manager of the New York, Lake Erie & Western, and from May, 1881, to December, 1885, was general manager of the Chesapeake & Ohio. From December, 1885, to June, 1889, he was vice-president, and from February, 1886, to May, 1887, was also general manager of the Atchison, Topeka & Santa Fe, including its coast lines. From June, 1889, to November, 1895 he was engaged in railway expert work. He was receiver of the Atlantic & Pacific (now part of the Santa Fe) from February, 1896, to July, 1897, and from that time until 1903 was president of the Los Angeles & Pasadena Electric.

The British government has accepted, as completely satisfactory, the proposals now made for the international control of the projected Trans-Persian line for linking up the Russian and Indian railway systems. The British government has throughout strongly upheld the necessity of absolute equality of British, Russian and French control in the undertaking, and when, some weeks ago, the arrangements proposed were thought not to meet this view, certain modifications were suggested, and some members of the Russian group came to this country last week in connection with this phase of the situation. A formal memorandum has now been drafted and submitted to the British government, and has been accepted as being completely satisfactory. The business of completing the survey of the Trans-Persian line, and of obtaining the necessary concession from Persia, will soon be taken in hand, and it is hoped that this may be completed within a few months, as a great portion of the route has already been surveyed. The question of the break of the gage between Russian and Indian systems, on which the Indian government has already expressed its views, is one of the many questions to be settled, but no difficulty is likely to arise over this matter, as Russia is quite prepared to meet the views of India.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE GRAND TRUNK has ordered 15 switching locomotives from the Canadian Locomotive Works.

THE LIGONIER VALLEY has ordered 1 consolidation locomotive from the Baldwin Locomotive Works.

THE NORTHERN PACIFIC has ordered 10 switching locomotives from the American Locomotive Company.

THE MICHIGAN ALKALI has ordered 1 six-wheel switching locomotive from the Baldwin Locomotive Works.

THE EAST BROAD TOP RAILROAD & COAL COMPANY has ordered 1 mikado locomotive from the Baldwin Locomotive Works.

THE IMPERIAL GOVERNMENT RAILWAYS OF JAPAN have ordered 24 Mallet locomotives (0-6-6-0) from the American Locomotive Company. The dimensions of the cylinders will be 15½ in. and 24½ in. x 24 in.; the dimension of the driving wheels will be 49 in., and the total weight in working order will be 141,000 lbs.

CAR BUILDING.

THE LITCHFIELD & MADISON is said to be in the market for 200 steel gondolas.

THE LEHIGH VALLEY & NAVIGATION COMPANY is in the market for 175 mine cars.

THE GRAND TRUNK is in the market for 2,000 thirty-ton box cars and 50 tank cars.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 26 passenger cars from the Pullman Company.

THE OREGON ELECTRIC RAILWAY is in the market for 25 60-ft. electric passenger coaches and six 60-ft. electric combination passenger and baggage cars.

THE BALTIMORE & OHIO has ordered 1,000 steel underframes from the Ralston Steel Car Company and 400 steel underframes from the Pressed Steel Car Company.

THE SOUTHERN RAILWAY, mentioned in the *Railway Age Gazette* of June 21 as being in the market for 200 box cars, 150 automobile cars and 100 flat cars, is now in the market for 650 box cars and 150 flat cars.

IRON AND STEEL.

THE CANADIAN NORTHERN is said to be in the market for 10,000 tons of rails.

THE PERE MARQUETTE will soon be in the market for 5,000 tons of 90-lb. rails.

THE PEORIA & EASTERN has ordered 6,000 tons of rails from the Illinois Steel Company.

THE LOUISVILLE & NASHVILLE has ordered 12,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

SIGNALING.

New Installations of Block Signals, Interlocking, Telephones for Train Despatching, Etc.

The Washington, Baltimore & Annapolis Electric has just put in service (at 4 a. m., June 24) 13.2 miles of single track automatic block signaling, the apparatus for which was installed in 30 days. The line equipped is the division between Naval Academy Junction and Annapolis. There are nine a. c. track circuits, seventeen semaphore signals, sixteen light signals, and two switch indicators. Desiring to have this signaling in service for the traffic incident to the Democratic Convention, which opened June 25, the company awarded the contract to the Union Switch & Signal Company on May 6; the first shipment of material arrived on the ground May 23, and the signals were in operation on June 21, a highly creditable record.

Supply Trade News.

Frank M. Gilmore, president of the E. D. E. Company, Chicago, has been made agent for C. H. Whall & Co., Boston, Mass., with office in Chicago.

The Brownell Company, Dayton, Ohio, maker of automatic and throttling engines, boilers, feed water heaters, etc., has opened a branch office in the Oliver building, Pittsburgh, Pa., in charge of B. S. Rederer.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., has let contracts for the construction of its No. 3 chipping shop and building, which will be 100 ft. x 600 ft. The three 10-ton cranes for this building were recently ordered from the Alliance Machine Company, Alliance, Ohio.

Gilbert H. Pearsall, secretary of Joseph T. Ryerson & Son, Chicago, has been made a vice-president of the Jacobs-Shupert United States Firebox Company, Coatesville, Pa., and Charles



G. H. Pearsall.

Brearely Moore, vice-president of the American Arch Company, New York, has resigned that position to become a vice-president of the Jacob-Shupert company. Mr. Pearsall will be in charge of the New York office of the Jacob-Shupert company. He still retains his position as secretary of the Ryerson company, with which concern he has been connected since May, 1901. Since January 1, 1905, he has been in general charge of the sales of that company. In 1887 Mr. Pearsall entered the service of the Erie, with office at Owego, N. Y. From 1891 to 1897 he was

chief rate clerk of the Chicago, Burlington & Quincy, and from 1897 to 1899 he was chief clerk in the traffic manager's office of the Indiana, Illinois & Iowa, now a part of the New York Central Lines. From 1899 and 1901 he was city freight agent and freight agent of the Delaware, Lackawanna & Western. In May, 1901, he resigned his position with that road to go to the Ryerson company. Mr. Moore will have charge of the western sales department of the Jacob-Shupert company, with office in Chicago. He was born in McComb, Ill., in 1874, and received his primary education in the public schools, graduating in 1891 from the Kewanee, Ill., high school. In 1895 he graduated from the Lake Forest University and then went to the Northwestern University law school, from which he graduated in 1898. In 1900 he organized the Columbia Boiler Company to make house heating apparatus and



C. B. Moore.

boilers. In 1902 he organized the American Locomotive Equipment Company, of which he was general manager and a director until 1911, when he was made president of the company. Mr. Moore shared in the organization of the American

Arch Company in 1910 and was made vice-president and a director of that company. In 1911 he organized the Boss Nut Company, Chicago, of which he is now a director. Mr. Moore has invented and developed a number of locomotive devices, of which his brick arch is the best known.

The Strauss bascule bridge design has recently been adopted by the Canadian Northern for a 101 ft. single-leaf, double-track bridge over the Assiniboine river at Winnipeg, Man.; also for a 96 ft. single-leaf, double-track bridge over Rainy lake; and by the San Antonio & Aransas Pass for a 39 ft. 9 in. single-leaf, single-track bridge over Corpus Christi bay.

W. L. Allison, of the Franklin Railway Supply Company, Detroit, Mich., has been made general sales manager of the American Arch Company, New York, with office in Chicago. Mr. Allison will hereafter represent both companies. F. T. Heffelfinger, of Minneapolis, has been elected vice-president of the American Arch Company, succeeding C. B. Moore, resigned, to go to the Jacobs-Shupert United States Fire Box Company, Coatesville, Pa., as vice-president.

John Gill, who was superintendent of motive power of the Chicago, Indianapolis & Louisville from 1901 to 1910, has been made manager of the Permanent Manufacturers' Exhibit of Railway Supplies and Equipment in the Karpen building, Chicago. Mr. Gill served as machinist apprentice, machinist, gang boss, locomotive fireman and locomotive engineer on the Chicago, Burlington & Quincy at St. Louis, and was later employed on the Rock Island as locomotive engineer, roundhouse foreman, machine shop foreman, general foreman and master mechanic.

The Imperial Car Company, Hamilton, Ont., has been organized with \$6,000,000 capital to erect a car building plant on a 50-acre site on the water front east of Hamilton. The company will make wooden and steel freight cars. The contract for the construction of the plant and equipment will be let at once. The capacity of the plant will at first be 30 cars a day, and later will be increased. Among the directors are W. G. Rose, director of the Dominion Steel & Iron Company, Montreal, Que.; G. H. Cohan, president of the Western Canada Power Company, Montreal; Sir Henry Pellatt, Toronto, Ont., and Basil Magor, president of the Magor Car Company, Passaic, N. J.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., the Equitable Trust Company, New York, the Stone & Webster Corporation, Boston, Mass., and William Morris Imbrie & Company, New York, have formed a syndicate and have bought the controlling interest in the Electric Properties Company, New York, from the Westinghouse Machine Company, Pittsburgh, Pa. This purchase was made to put the Electric Properties Company on a better paying basis and to make it more active in the development of the electrical properties and in the acquisition of new properties. This would enlarge the market of the Westinghouse Electric & Manufacturing Company. No new financing will be done immediately, and the officers and directors will remain unchanged for the present.

The annual report of the American Car & Foundry Company, New York, for the year ended April 30, 1912, shows that the net earnings were \$2,839,231, as compared with \$4,234,789 in the preceding year, a decrease of \$1,395,558, after the deduction of \$1,354,519 for renewals, replacements, repairs, new patterns, flasks, etc. President F. H. Eaton says that while the net earnings are smaller than in 1911, nevertheless they are gratifyingly large when there is taken into consideration the conditions with which all industries dependent in any degree upon the operations of the railways have had to contend. The railways remained out of the market for new equipment for a very considerable part of the year, and when buying was actively resumed it was on a keenly competitive basis with a narrow margin of profit. The company begins the fiscal year 1912-1913 with all its plants, including the four steel passenger car plants, operating with a comfortable volume of orders. The company has taken advantage of the general slackness existing during a part of the year to make a thorough overhauling of various plants, the expenditure for which has been charged in part against the reserve for that purpose and in part to current earnings. From the reserve for the construction of and additions to steel car plants there has been expended during the year \$478,386, for additions to the Berwick, St. Charles, St. Louis, Madison, Wilmington and Chicago plants,

leaving at the close of the fiscal year in this account the sum of \$799,408. The regular 7 per cent. dividend was paid on the preferred stock and 2 per cent. on the common stock, and \$139,231 was added to the surplus as compared with \$784,789 added in 1911. The total surplus as of April 30, 1912, was \$24,876,576. At the annual meeting in Jersey City on June 27 the officers of the company were all re-elected.

Charles F. Uebelacker, Charles N. Black and William von Phul have been made partners of Ford, Bacon & Davis, New York, engineers. Charles F. Uebelacker graduated from Princeton University in 1899 as electrical engineer. During the next few years he was chief engineer of the Short Electric Railway and the Brush Manufacturing Company, Cleveland, Ohio; electrical engineer of the Consolidated Traction Company, Newark, N. J., and chief engineer and manager of the Peckham Truck Company, Kingston, N. Y. In 1899 he went to Ford, Bacon & Davis as vice-president and general manager of the Elmira Water Light & Railroad Company, Elmira, N. Y. In 1901 Mr. Uebelacker went to the New York office of Ford, Bacon & Davis, where he has been chief engineer since 1902. Charles N. Black graduated from Princeton University as electrical engineer in 1890. During the following few years he was superintendent of the shops of the Brush Manufacturing Company and manager of the New Haven, Conn., factory of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. In 1899 he went to Ford, Bacon & Davis as chief engineer, which position he held until 1902. Mr. Black was in charge of the conversion of the Kansas City cable system into an electric railway. When this work was completed in 1902 he was made vice-president and general manager of the Kansas City Railway & Light Company, which position he held until 1907, when he was made vice-president and general manager of the United Railroads of San Francisco, which position he now holds. William von Phul graduated from Tulane University in 1891 as mechanical engineer. During the next ten years he was general superintendent of the Louisiana Electric Light Company and of the Edison Electric Light Company, New Orleans, La., and also of the New Orleans & Carrollton Railroad, Light & Power Company. He was then made general superintendent of the Cincinnati Gas & Electric Company. In 1905 he went to Ford, Bacon & Davis, with office in New Orleans. Mr. von Phul is also president of the American Cities Company.

TRADE PUBLICATIONS.

CHICAGO & ALTON.—The passenger department has issued an attractive folder describing the summer resorts reached by the Alton and its principal connections.

STEEL VALVES.—The Nelson Valve Company, Chestnut Hill, Philadelphia, Pa., has published a very full booklet on Nelson steel valves, giving illustrations, diagrams, descriptions and prices. These valves are made in a large variety of designs for different purposes.

VANADIUM STEELS.—The American Vanadium Company, Pittsburgh, Pa., has published an 80-page booklet on Vanadium Steels, giving information on the experience with these steels up to date. This booklet describes the various compositions and heat treatments, and includes tables of tests.

SNOW PLOWS AND CARS.—The Russell Car & Snow Plow Company, Ridgway, Pa., has published a catalog of its snow plows, crane cars, gondola cars, combination baggage and express cars, etc. This catalog includes illustrations, brief descriptions and the principal dimensions of these cars.

SOUTHERN RAILWAY.—The industrial department of the Southern Railway has just published a 32-page illustrated booklet on Fruit Growing in the Southeast. Naturally, in the space devoted to the subject, details of land cost and the adaptability of particular localities to particular fruits can only be suggested. The booklet, however, sketches a quite alluring situation in regard to the possibilities of profitable fruit raising in the territory reached by the Southern Railway and its affiliated lines. The booklet is well illustrated by actual photographic views, some of which show orchards of a size which suggests Oregon or California rather than Virginia or North Carolina. It is a booklet that is well worth looking over by anyone who is interested in the agricultural development of the United States.

Railway Construction.

New Incorporations, Surveys, Etc.

AMERICUS, TIFTON & ATLANTIC.—Incorporated in Georgia with \$100,000 capital, to build from Americus, Ga., south to the Georgia-Florida state line, about 100 miles. The line may eventually be extended to Jacksonville, Fla. The incorporators include J. S. Shingler, Ashburn, Ga., and H. H. Tift, Tifton.

ATLANTA & MACON (Electric).—A contract has been given to the South Atlantic Contracting & Construction Company, Atlanta, Ga., it is said, to build from Atlanta, Ga., southeast to Macon, 88 miles. H. N. Randolph, secretary, Atlanta. (June 21, p. 1589.)

CANADIAN NORTHERN.—This company has under construction 853 miles of new lines, as follows: Montreal, Que., to Hawkesbury, 58 miles; Ottawa, Ont., to the Ottawa river, 32 miles; west from Ruel, Ont., 100 miles; east from Port Arthur, 108 miles; branch lines and extensions in Alberta and Saskatchewan, 400 miles; British Columbia, 75 miles; Sydenham, Ont., to Ottawa, 80 miles, and is also relaying track on the main line west, 200 miles. Extensive harbor and terminal improvements are being carried out at Port Mann, B. C.; the plans have been approved and work is to be started soon on large terminal shops and yards. The Montreal, Que., terminals and tunnel are to be completed in 1914.

The route of this company's entrance into North Toronto has been approved subject to one slight change. The route follows the line of the Canadian Pacific from a point east of Yonge street to Eglinton avenue, thence southeast to a connection with the Canadian Northern Ontario.

CENTRAL IDAHO.—See Oregon Short Line.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has let contracts for second-track work from Hopkins, Minn., to Cologne, 23 miles, to A. B. Cook & Co., St. Paul; and from Twin Brooks S. Dak., to Summit, 15 miles, to John Marsch, Chicago.

CHICAGO, SPRINGFIELD & CAIRO.—Incorporated in Illinois with \$10,000 capital and headquarters at Chicago to build from Chicago, south to Springfield and Cairo. The incorporators include D. P. Phelps, M. C. Myers, C. G. Fox, J. T. Darling and W. C. Gregory, all of Chicago.

COLORADO & SOUTHERN.—An officer writes that the improvements to be carried out on the line from Orin Junction, Wyo., south includes replacing 56 lb. rail with 85 lb. rail on 35 miles, and constructing a four-stall temporary engine house and a 50 ton coal chute at Hartville Junction. H. W. Cowan, chief engineer, Denver, Colo. (May 17, p. 1139.)

GEORGIA COAST & PIEDMONT.—This company has made a mortgage and plans to build an extension from Darien, Ga., to Brunswick, 15 miles. The work is to be started about July 15.

GEORGIA ROADS.—Plans are being made, it is said, to build from Macon, Ga., west to Waverly Hall, about 70 miles. Trackage rights may be secured for a section of about 15 miles over the Macon & Birmingham. The Macon Chamber of Commerce, and S. W. Hatcher, are interested.

GULF, TEXAS & WESTERN.—An officer writes that a contract has been given to the Texas Building Company, Fort Worth, Tex., to build an extension from Jacksboro, Tex., south to Saleville, 23 miles, where connection is to be made with the Weatherford, Mineral Wells & Northwestern. The contract provides for the completion of the line ready for operation, with the exception of the rails and fastenings, which have already been bought. (June 14, p. 1364.)

HUNTINGTON, RICHMOND & HAMILTON.—Incorporated in Indiana with \$100,000 capital to build from Huntington, Ind., south via Bluffton, Portland and Union City to Richmond, 98 miles. The directors include S. H. Bracey, L. Brandenburg, F. A. Dolph and F. Bimmel.

IRON COUNTY CENTRAL.—Incorporated in Missouri, with \$60,000 capital, to build a six-mile line from Bixby, Mo., to timberlands. The incorporators include L. T. Carroll, D. A. Bixby and A. B. Brigham, St. Louis, Mo.

MEXICAN PACIFIC.—Financial arrangements are said to be made to build between Balsas, Guerrero, Mex., and the Pacific ports of Acapulco and Zihuatanejo, with a branch to Urupan, Michoacan, in all about 580 miles. Preliminary surveys have

been made and sections of the line have been located. Several miles of grade has been constructed from Acapulco. The plans call for building two large cement docks, one at Acapulco and the other at Zihuatanejo. The concession from the Mexican government requires that the work shall be finished within seven years from the signing of the contract, and the company plans to finish all the work within five years. A large force of men are to be put at work within the next few months. Connection is to be made at Balsas with the Cuernavaca division of the National Railways of Mexico, and the branch line will connect at Urupan with the Morelia division of the National Railways of Mexico. The route is through a mountainous section. M. Thomson, president, Seattle, Wash.; Joseph Castellet, vice-president, and Henry Weiss, general manager, Mexico City. (April 5, page 824.)

MISSOURI PACIFIC.—An officer writes regarding the reports that St. Louis Iron Mountain & Southern from St. Louis, Mo., south to Texarkana, Ark., 494 miles, is to be double tracked that the company does not contemplate at present carrying out this work, but will double track the part of the line where the traffic is the heaviest. Double track is being put in between Bald Knob, Ark., and McAlmond, nine miles; 100-lb. rail is being used. When the work now under way is completed, the Iron Mountain will have 191½ miles of double track. The company does not contemplate at the present time the construction of an extension to New Orleans, La. Work on the extension from West Memphis, Ark., southwest to Marianna, is partly completed. This work has been seriously interfered with by high water from the Mississippi and the St. Francis rivers. That entire division has been under water for about two months past, and the company was only recently able to resume work on the track. The line will probably be completed and put in operation in three or four months. E. F. Mitchell, chief engineer, St. Louis, Mo.

NATIONAL RAILWAYS OF MEXICO.—See an item on New Construction in Mexico under General News.

NORFOLK & WESTERN.—An officer writes that there is no truth in the report that second track is to be laid near Farmville, Va. The only double-tracking work under way is being carried out on the eastern end between Gilmerton, Va., and Suffolk, also between Nottoway and Burkeville, and between Evergreen and Phoebe. C. S. Churchill, chief engineer, Roanoke, Va.

OREGON EASTERN.—See Oregon Short Line.

OREGON SHORT LINE.—Work is now under way on the Teuton Basin branch from Ashton, Idaho, southeast to Driggs, 37½ miles. The Central Idaho is building from Richfield, Idaho, west to Taft, 58 miles; the Salt Lake & Idaho is building from Burley, Idaho, southeast to Kelton Summit at the Utah-Idaho state line, 60½ miles. The line has been graded and is ready for track laying, but construction work has been suspended, due to an injunction of the United States government. This line will eventually be extended southwest, it is said, to a connection with the Southern Pacific at Saline on the Ogden-Lucien cut-off. Work is also under way on the Southside line from Nyssa, Ore., south to Homedale, Idaho, 26 miles. This line is eventually to be extended, it is said, to Buhl, the present terminus of the Twin City Falls branch. The Oregon Eastern is building from Vale, Ore., southwest to Dog Mountain, 139 miles. This is to be the first section of a line through central Oregon, and there will be several tunnels and numerous bridges on the line. Double-tracking work is also being carried out from Ogden south to Farmington on the last 20½ miles. This work completes the double-tracking from Salt Lake City, Utah, north to Ogden. Plans are now being made for building several other new lines on which construction work has not yet been authorized.

QUANAH, SEYMOUR, DUBLIN & ROCKPORT.—An officer writes that a contract has been entered into by this company with E. Cowperthwaite and associates, of London, England, to finance and build this line from Rockport, Tex., on the gulf coast, to Belton. This work is to be finished within two years, and the section from Belton to Quanah, near the Oklahoma state line, is to be finished within three years. L. E. Walker, president, Austin; R. Y. Walker, chief engineer, Belton. (March 29, p. 781.)

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See Missouri Pacific.

SALT LAKE & IDAHO.—See Oregon Short Line.

Railway Financial News.

TENNESSEE RAILROAD.—Organized in Tennessee with \$10,000 capital to build from Iron City, Lawrence county, Tenn., northwest to Olivehill, Hardin county, about 40 miles. The incorporators include C. N. Brady, R. D. Baker, I. L. Pendleton, W. W. Collin and J. H. De Witt.

TEXAS ROADS.—Plans are being made to build from Corsicana, Tex., southeast to Palestine, about 60 miles. G. R. Turner is the promoter.

VIRGINIA-CAROLINA.—An officer writes that plans call for building an extension south from the mouth of the Green Cove creek following the course of that creek through Washington and Grayson counties, Va., thence along Horse creek in Ashe county, N. C., up the North Fork of New river and along Buffalo creek via Jefferson, to Elk Cross Roads (Todd) on the county line between Ashe and Watauga counties, thence to Boone. It has not yet been definitely decided when bids will be asked for the work, which will be largely through a mountainous section. The company expects to develop a traffic in forest products, agricultural products, ore and coal. P. W. Early, chief engineer, Abingdon, Va. (June 28, p. 1627.)

WHITE SULPHUR & HUNTERSVILLE.—Incorporated in West Virginia, with \$30,000 capital, to build from White Sulphur, W. Va., northeast to Huntersville, about 40 miles. The incorporators include F. A. Hauck, Ronceverte, W. Va., and W. B. Bunting, Baltimore.

RAILWAY STRUCTURES.

BALLSTON, N. Y.—See Boonville, N. Y.

BELLEFONTAINE, OHIO.—The Cleveland, Cincinnati, Chicago & St. Louis has approved contracts for improvements to its shops and yards at this point to be made this summer, at an estimated cost of \$178,000.

BOONVILLE, N. Y.—Applications have been made by the State Highway Commission to the New York Public Service Commission, Second district, asking for the elimination of railway grade crossings as follows: New York Central & Hudson River in Boonville, Oneida county, and in the town of Canton, St. Lawrence county; New York, Ontario & Western in Hastings, Oswego county, and the Delaware & Hudson in Ballston, Saratoga county. The state's proportion of the cost for the removal of these crossings is to be paid from the good roads fund.

BREWSTER, N. Y.—The New York Public Service Commission, Second district, has ordered the elimination of the New York Central & Hudson River grade crossing in the town of Southeast, near Brewster, Putnam county. The highway is to be carried under the tracks by means of a subway. The state's proportion of the cost of this improvement will be paid out of the good roads fund.

CANTON, N. Y.—See Boonville, N. Y.

COUNCIL BLUFFS, IOWA.—The Chicago & North Western will build a new freight station at an estimated cost of \$42,000, to replace the old building which was burned last winter.

HARTVILLE JUNCTION, WYO.—See Colorado & Southern under Railway Construction.

HASTINGS, N. Y.—See Boonville, N. Y.

HAWKINSVILLE, GA.—The Gulf Line will put up a brick passenger station, it is said, at Hawkinsville.

MONTREAL, QUE.—See Canadian Northern under Railway Construction.

PORT MANN, B. C.—See Canadian Northern under Railway Construction.

ST. PAUL, MINN.—The Chicago Great Western is preparing plans for a new bridge to be built over the Mississippi river at St. Paul, 742 ft. long. There will be seven plate girder spans and one 190 ft. vertical lift truss span.

TEXARKANA, TEX.—The Kansas City Southern has announced that a new passenger station costing from \$125,000 to \$150,000 will be built immediately.

TRENTON, ONT.—Residents of Trenton have voted to grant to the Canadian Pacific a free site for a roundhouse and station on condition that Trenton is made a division point. The station, yard and shops are to be located in the eastern part of the town and in part of Sidney township.

CENTRAL PACIFIC.—Final arrangements have been made and the last of the 1911 issue of 50,000,000 francs (\$10,000,000) have been officially listed on the Paris Bourse.

CHESAPEAKE & OHIO OF INDIANA.—This company, all of whose stock is owned by the C. & O., has increased its stock from \$5,000,000 to \$6,000,000. Of the new stock, 132,706 is to be issued for capital expenditures already made.

CHICAGO & ALTON.—E. A. Worthington, recently elected president, has been made a director, succeeding J. Stuart MacKie, resigned.

CHICAGO, MEMPHIS & GULF.—The United States district court has overruled the demurrer of the C. M. & G., in a proceeding brought by the Illinois Central to enforce an option of the Illinois Central to buy the C. M. & G. One of the grounds on which the demurrer was filed was that the option was against public policy and against the interest of the public. The agreement, as claimed to be by the Illinois Central, was, that should the Chicago, Memphis & Gulf be extended to connect with any other line than the Illinois Central, the I. C. was to have an option purchase.

CONNELLSVILLE STATE LINE.—See Western Maryland.

FORT DODGE, DES MOINES & SOUTHERN.—The United States district court has authorized the issue of \$800,000 receivers' certificates. The proceedings of the sale are to be used to pay off \$720,000 receivers' certificates now outstanding, and to make improvements costing \$80,000.

GEORGE'S CREEK & CUMBERLAND.—See Western Maryland.

GEORGIA COAST & PIEDMONT.—F. J. Lisman & Co., New York, have bought a block of the company's \$3,500,000 authorized 5 per cent. bonds of April 1, 1912-1962.

NEW YORK, ONTARIO & WESTERN.—Directors have voted not to pay a dividend for the year ended June 30, 1912. There is \$58,113,982 stock outstanding, of which the New York, New Haven & Hartford owns \$29,160,000. Since 1906, the N. Y. O. & W. has paid annual dividends of 2 per cent. In a statement issued by the management, it was said that the year's gross earnings were estimated at \$8,500,000, or about \$800,000 less than in the previous years, and that the final surplus available for dividends would be about \$470,000, which is less by \$670,000 than the surplus available for dividends at the end of the 1911 fiscal year.

NORFOLK SOUTHERN.—Stockholders have authorized a bond issue of \$5,456,000 for the acquisition and extension from Raleigh, N. C., to Charlotte, of the Raleigh, Charlotte & Southern properties.

PERE MARQUETTE.—No cash has been provided for interest due July 1, on the outstanding \$5,000,000 six per cent. debentures. These debentures were the ones issued to preferred and common stockholders in the reorganization of 1907.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—To facilitate the execution of the new \$200,000,000 refunding mortgage, seven New York directors of the St. Louis, Iron Mountain & Southern have resigned, and have been succeeded by seven residents of Arkansas. This temporary change has been made to comply with certain requirements of the Arkansas state laws.

TOLEDO TERMINAL R. R.—D. C. Moon and E. J. Chamberlin have been elected directors, succeeding C. E. Schaff, resigned, and Charles M. Hayes, deceased. H. B. Ledyard has also been elected a director.

WESTERN MARYLAND.—The Cumberland extension, which connects with the Pittsburgh & Lake Erie, will be operated under the names of the George's Creek & Cumberland and the Connelville State Line.

The railway from Toledo, Chile, to Vallenar is nearing completion. The total length of the line is 104 miles, 32 miles of which are still to be constructed.